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LAKE CHAMPLAIN, NEW YORK, AND VERMONT

Pacific Northwest Environmental Research Laboratory

Prepared for :

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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ON
LAKE CHAMPLAIN
NEW YORK
AND
VERMONT

EPA REGIONS I AND II

WORKING PAPER NO. 154

WITH THE COOPERATION OF THE
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DECEMBER, 1974

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the New York Department of Environmental Conservation and the Vermont Agency of Environmental Conservation for professional involvement and to the New York and Vermont National Guards for conduct of the tributary sampling phase of the Survey.

Henry L. Diamond, Commissioner of the New York Department of Environmental Conservation and Martin L. Johnson, Secretary of the Vermont Agency of Environmental Conservation and their respective staff provided invaluable lake documentation and counsel during the Survey.

Major General John C. Baker, the Adjutant General of New York and Project Officer Lieutenant Colonel Fred Peters; Major General Reginald M. Crum, the Adjutant General of Vermont, and Project Officer Major Howard Buxton who directed the volunteer efforts of the New York and Vermont National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF NEW YORK

LAKE NAME	COUNTY
Allegheny Reservoir	Cattaraugas, NY; McLean, Warren, PA
Black	St. Lawrence
Canadaigua	Ontario
Cannonsville	Delaware
Carry Falls	St. Lawrence
Cassadaga	Chautauque
Cayuga	Seneca, Tompkins
Champlain	Clinton, Essex, NY; Addison, Chittenden, Franklin, VT
Chautauqua	Chautauqua
Conesus	Livingston
Cross	Cayuga, Onondaga
Goodyear	Otsego
Huntington	Sullivan
Keuka	Ontario
Long	Hamilton
Lower St. Regis	Franklin
Otter	Cayuga
Owasco	Cayuga
Raquette Pond	Franklin
Round	Saratoga
Sacandaga Res.	Fulton, Saratoga
Saratoga	Saratoga
Schroon	Essex, Warren
Seneca	Seneca, Schyler, Yates
Swan	Sullivan
Swinging Bridge Res.	Sullivan

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF VERMONT

LAKE NAME	COUNTY
Arrowhead Mountain Lake	Chittenden, Franklin
Clyde Pond	Orleans
Harriman Reservoir	Windham
Lake Champlain	Addison, Chittenden, Franklin
Lake Lamoille	Lamoille
Lake Memphremagog	Orleans
Waterbury Reservoir	Washington, Lamoille

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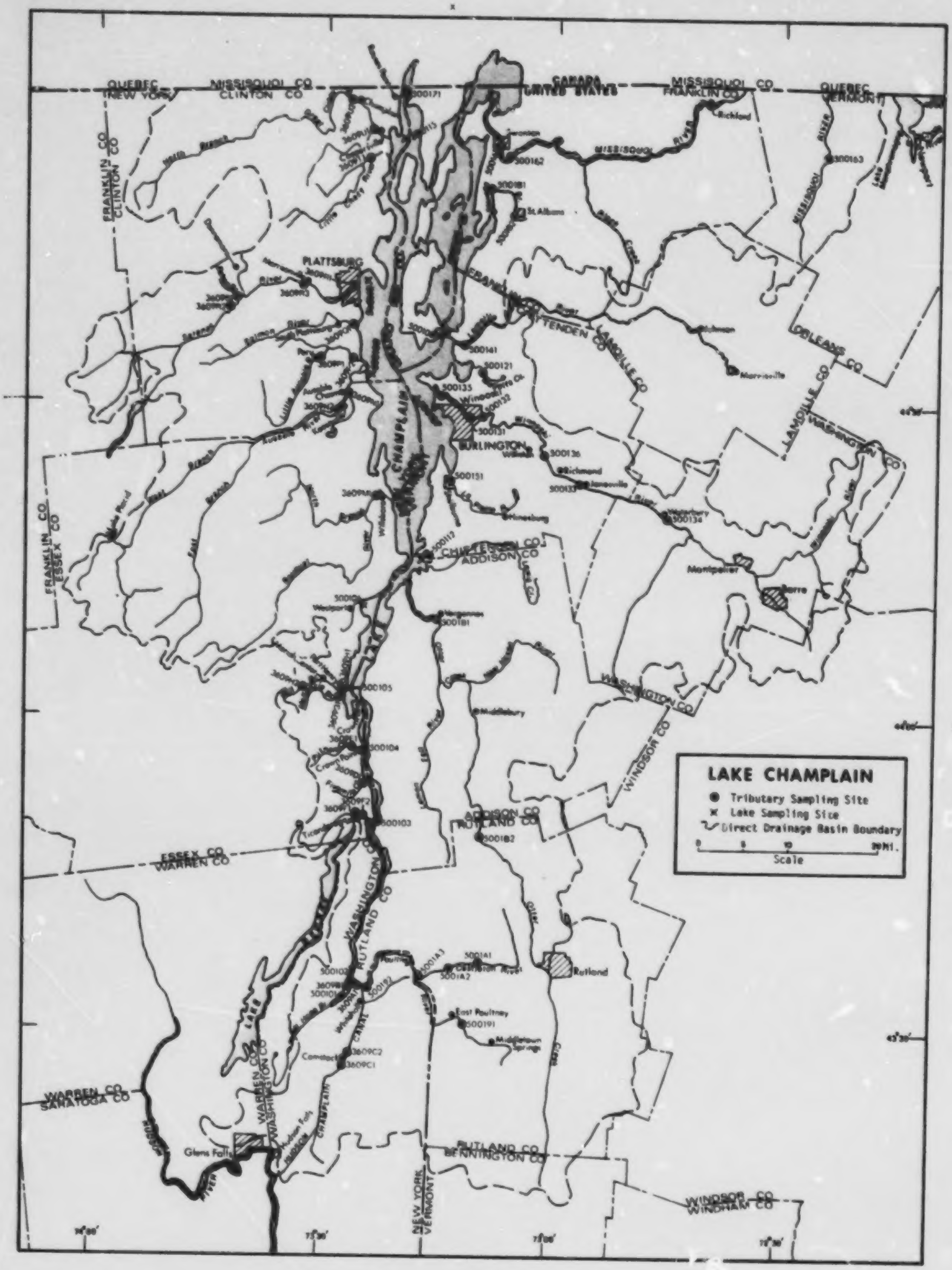
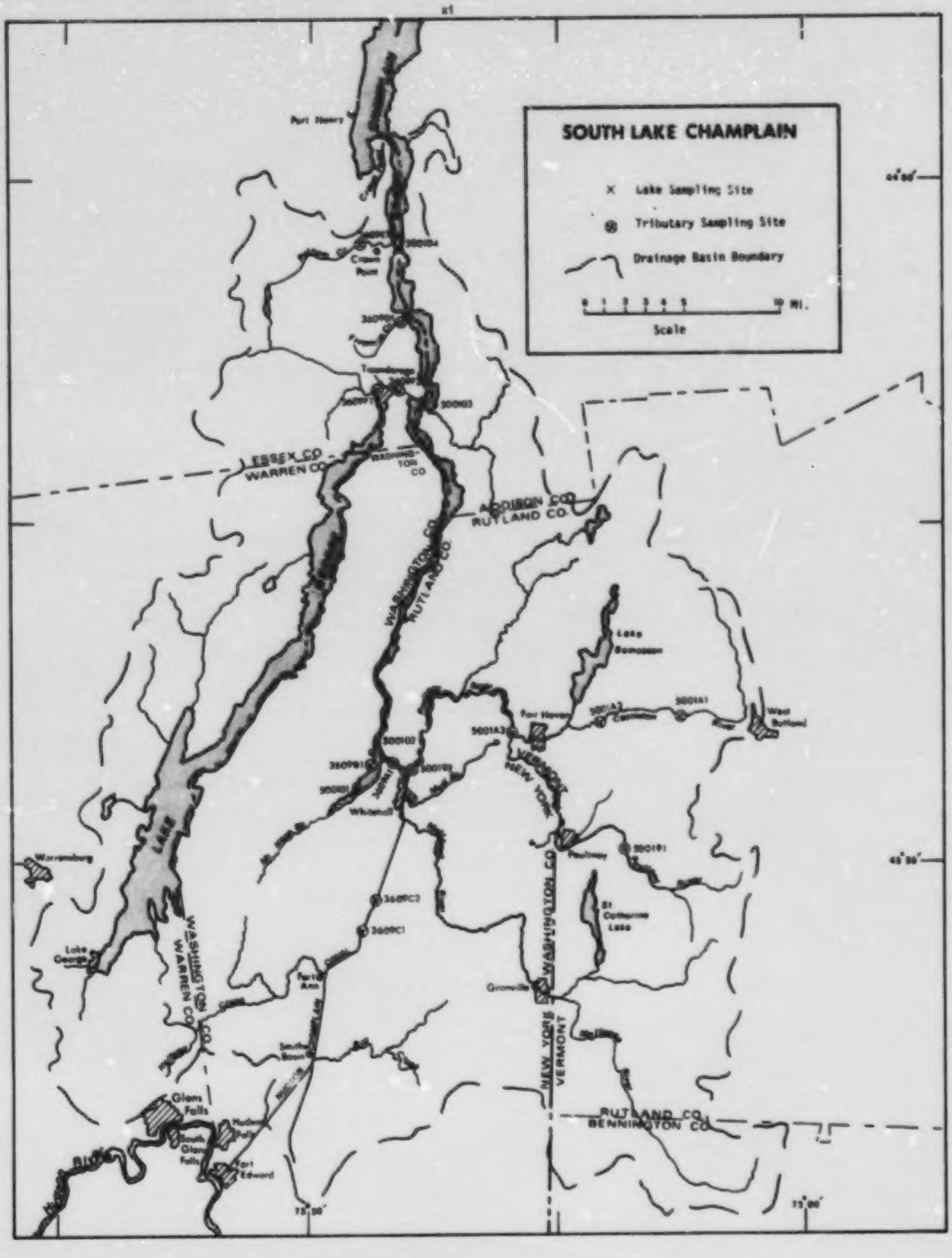

LAKE CHAMPLAIN
Tributary Sampling Site
Lake Sampling Site
Direct Drainage Basin Boundary
0 5 10 20 Mi.
Scale
QUEBEC
NEW YORK
MISSISQUOI CO
CLINTON CO
CANADA
UNITED STATES
MISSISQUOI CO
FRANKLIN CO
QUEBEC
VERMONT
FRANKLIN CO
CLINTON CO
Richford
MISSISQUOI
River
300171
300162
300181
St.Albans
300163
PLATTSBURG
300141
300121
300135
300132
300131
BURLINGTON
300136
Richmond
300133
Jonesville
Morrisville
ORLEANS CO
LAMOILLE CO
WASHINGTON CO
300151
Hinesburg
Waterbury
300134
Montpelier
Barre
CHITTENDEN CO
ADDISON CO
300112
300101
Vergennes
300181
300105
Middlebury
WASHINGTON CO
WINDSOR CO
300104
300103
FRANKLIN CO
ESSEX CO
ESSEX CO
WARREN CO
ADDISON CO
RUTLAND CO
300182
WASHINGTON CO
RUTLAND CO
3001A1
3001A3
3001A2
Castleton River
Rutland
300102
East Poultney
300191
Middletown Springs
3609C2
3609C1
Comstock
LAKE GEORGE
WARREN CO
SARATOGA CO
WARREN CO
WASHINGTON CO
Glens Falls
Hudson Falls
HUDSON RIVER
CHAMPLAIN
NEW YORK
VERMONT
RUTLAND CO
BENNINGTON CO
WINDSOR CO
WINDHAM CO
CHAMPLAIN
LAKE


x1
SOUTH LAKE CHAMPLAIN
× Lake Sampling Site
Tributary Sampling Site
Drainage Basin Boundary
0 1 2 3 4 5 10 Mi.
Scale
44°00'
Port Henry
Crown Point
500104
360901
Ticonderoga
360911
500103
ESSEX CO
WARREN CO
WASHING-TON CO
ADDISON CO
RUTLAND CO
WASHINGTON CO
RUTLAND CO
Lake Bomoseen
Fair Haven
5001A3
5001A2
5001A1
Castleton
West Rutland
500102
360981
500101
Whitehall
500191
VERMONT
NEW YORK
Poultney
500191
43°30'
Warrensburg
LAKE
St Catherine Lake
3609C2
3609C1
WASHINGTON CO
NEW YORK
VERMONT
Granville
Lake George
WASHINGTON CO
WARREN CO
Fort Ann
Smiths Basin
Glens Falls
Hudson Falls
South Glens Falls
Fort Edward
RUTLAND CO
BENNINGTON CO
73°30'
73°00'

LAKE CHAMPLAIN

STORET NO. 5001

I. CONCLUSIONS

A. Trophic Condition:

1. Lake Champlain exhibits a variety of trophic conditions ranging from near oligotrophic in the deeper main lake areas to eutrophic in some of the bays and near-shore areas.

2. South Lake Champlain has characteristics commonly associated with eutrophy, i.e., shallow and nutrient rich; however, primary production in South Lake Champlain is apparently suppressed by natural turbidity caused by non-biological materials.

3. While the main water body of Lake Champlain is currently in an acceptable trophic condition, some of the embayments and the South Lake Champlain have shown signs of accelerated eutrophication. It is believed that the continued addition of unnecessarily high quantities of phosphorus will shorten the useful life of the lake.

B. Limiting Nutrient:

1. The algal assay tests indicate that phosphorus is the nutrient of major importance in controlling primary production in Lake Champlain.

C. Nutrient Controllability:

1. The average yearly total phosphorus input from point and non-point sources to Lake Champlain is estimated to be 1,318,650 pounds before the New York phosphate detergent ban.

2. Of the total phosphorus input to Lake Champlain before the New York phosphate detergent ban, New York point sources (municipal and industrial) accounted for 11% (140,270 pounds) of the total annual input and Vermont point sources accounted for 19% (253,100) of the total annual input.

3. After the New York phosphate detergent ban*, the total annual phosphorus input to Lake Champlain is estimated to be 1,260,510 pounds.

4. Of the total phosphorus input to Lake Champlain after the New York phosphate detergent ban*, New York point sources accounted for 7% (82,230 pounds) of the total annual input and Vermont point sources accounted for 20% (253,100 pounds) of the total input.

5. The total annual nitrogen input to Lake Champlain is 28,928,400 pounds.

6. Of the total annual nitrogen input, only a maximum of 9% is contributed by New York and Vermont point sources.

7. The annual total phosphorus loading to South Lake Champlain from all sources before the New York phosphate laundry detergent ban was 197,350 pounds.

8. Of the total phosphorus input to South Lake Champlain before the ban, New York point sources contributed 31% (60,390 lbs) and

---

* The assumption was made that the New York phosphate laundry detergent ban will decrease the annual phosphorus load from New York municipal sewage treatment plants by 50%.

New York diffuse sources contributed 27% (54,080 lbs) of the total. Vermont point sources contributed 7% (13,650 lbs) and Vermont diffuse sources contributed 35% (69,230 lbs) of the total.

9. After the New York phosphate laundry detergent ban*, the total phosphorus input to South Lake Champlain is estimated to be 179,200 pounds per year.

10. Of the total phosphorus input to South Lake Champlain after the New York ban, New York point sources contributed 24% (42,240 pounds) and New York diffuse sources 30% of the total. Vermont point sources contributed 8% (13,650 pounds) and Vermont diffuse sources 38% (69,230 pounds) of the total.

D. Phosphorus Reduction:

1. In that primary production in the waters of Lake Champlain is stimulated by the addition of phosphorus, phosphorus inputs from all sources should be minimized to reduce the eutrophication rate.

2. Prior to the New York phosphate detergent ban, the loading rate to Lake Champlain was 0.53 grams total phosphorus/m^2 lake surface area/year.

3. If phosphorus inputs from New York and Vermont municipal and industrial discharges were decreased by 80% or equivalent reductions in phosphorus inputs from non-point sources were

---

* The assumption was made that the New York phosphate laundry detergent ban will decrease the annual phosphorus load from New York municipal sewage treatment plants by 50%.

attained, the loading rate to Lake Champlain would be reduced to 0.40 grams/m^2/year, or to 75% of the pre-ban loading rate.

4. According to the Vollenweider relationship, a loading rate of 0.53 grams total phosphorus/m^2/year is equivalent to a eutrophic condition for a lake with the morphometric characteristics of Lake Champlain, whereas a loading rate of 0.40 g/m^2/year corresponds to a mesotrophic loading rate.

II. INTRODUCTION

The National Eutrophication Survey was established by EPA in late 1971 with the directive to investigate all significant lakes and reservoirs in the contiguous United State which receive effluents from municipal sewage treatment facilities. The stated objectives of the Survey were to determine the extent of eutrophication in each water body and to assess the total nutrient input to each water body, differentiating between inputs from point-sources (primarily municipal) and diffuse land runoff. The goal was to determine the controllability of nutrients (particularly phosphorus), the impact of point source and non-point source nutrients on each study lake and the expected benefit to each lake by reducing the point-source nutrient inputs.

This report is concerned primarily with the trophic condition, nutrient levels and nutrient loadings of the waters of Lake Champlain and represents a preliminary assessment of the data gathered by the Survey from June, 1972 through June, 1973. Lake Champlain is but one of approximately 484 water bodies east of the Mississippi now being studied by the Survey, albeit an important one due to its size and the fact that it borders the States of New York and Vermont as well as the Canadian Province of Quebec.

In this report "Lake Champlain" refers to the entire lake which is defined as the portion extending from the southern tip of South Bay near Whitehall, NY to the Richelieu River outlet. The total drainage area of the Lake Champlain basin is approximately 7,744 square miles not including the Lake Champlain water surface area which is approximately 436 square miles. Lake Champlain can be described as long and narrow with a maximum length of 109 miles and a maximum width of 11 miles. The maximum depth of Lake Champlain is 400 feet and the mean depth is 64 feet. The mean hydraulic detention time is approximately 2.6 years.

In this report, "South Lake Champlain" refers to that portion of Lake Champlain extending from the southern tip of South Bay near Whitehall, NY to the Crown Point Bridge. The total drainage area of South Lake Champlain is 1,216 square miles not including the South Lake Champlain water surface area which is 22 square miles. South Lake Champlain is also long and narrow with a maximum length of 37 miles and a maximum width of less than two miles. The maximum depth of South Lake Champlain is 46 feet and the mean depth is 8 feet. The mean hydraulic detention time is approximately 40 days.

Separate phosphorus loading estimates were prepared for Lake Champlain and South Lake Champlain in this report. A nitrogen loading estimate was prepared only for Lake Champlain in its entirety.

The map on page x indicates the approximate location of each sampling site and delineates the U.S. portion of the Lake Champlain drainage area. The map on page xi shows only South Lake Champlain and its drainage area.

III. LAKE AND DRAINAGE BASIN CHARACTERISTICS

The morphometry and hydrology of Lake Champlain has been very thoroughly explained by Henson and Potash (1969); Potash, Sundberg, and Henson (1969); and Hunt, Boardman, and Stein (1971). For details to supplement the basic facts provided in this report, the reader is referred to those sources.

A. Morphometry of Lake Champlain (including South Lake Champlain):

1. Surface area: 436.4 square miles[1]
2. Mean depth: 63.6 feet[1]
3. Maximum depth: 400 feet[1]
4. Volume: 9.12×10^{11} cubic feet[1]
5. Mean hydraulic detention time: 2.6 years[2]

B. Tributary and Outlet Data for Lake Champlain:
(See Appendix B for all flow data)

1. Sampled Tributaries -

Name and State	Drainage Area at Sampling Point (sq.mi.)	Mean Flow at Sampling Point (cfs)
Missisquoi River, VT/Quebec	861.0	1,620
Stevens Brook, VT	2.5	5
Lamoille River, VT	715.0	1,322
Malletts Creek, VT	19.1	33
Winooski River, VT	1,062.0	1,638
LaPlatte River, VT	46.1	71
Otter Creek, VT	872.0	1,322

---

[1] Hunt, Boardman, and Stein (1971).
[2] Henson and Potash (1969).

Name and State	Drainage Area at Sampling Point (sq mi)	Mean Flow at Sampling Point (cfs)
Barge Canal - Poultney River, NY/VT	692.0	921
Ticonderoga Creek, NY	262.0	287
Fivemile Creek, NY	8.4	11
Putman Creek, NY	61.3	77
McKenzie Brook, NY	10.3	14
Mill Brook, NY	27.1	36
Hoisington Brook, NY	11.4	15
Bouquet River, NY	278.0	370
Ausable River, NY	518.0	689
Little Ausable River, NY	71.8	96
Salmon River, NY	66.0	88
Saranac River, NY	614.0	818
Little Chazy River, NY	51.2	68
Great Chazy River, NY	300.0	399
Minor tributaries and immediate drainage, NY/VT	1,195.[illegible]	1,589
Totals	7,744.2	11,483
2. Outlet -		
Richelieu River	8,180 sq.mi.	11,052 cfs[1]

---

[1] Henson and Potash (1969).

C. Morphometry of South Lake Champlain:
(See Appendix B for all flow data)

1. Surface area: 22.0 square miles[1]
2. Mean depth: 8 feet[1]
3. Maximum depth: 46 feet[1]
4. Volume: 4.94×10^9 cubic feet[1]
5. Mean hydraulic detention time: ~ 40 days

D. Tributary and Outlet Data for South Lake Champlain:

1. Sampled Tributaries -

Name and State	Drainage Area at Sampling Point (sq mi)	Mean Flow at Sampling Point (cfs)
Barge Canal - Poultney River System, VT/NY	692.0	921
Ticonderoga Creek, NY	262.0	281
Fivemile Creek, NY	8.4	11
Putnam Creek, NY	61.3	77
Minor tributaries and immdediate drainage, NY/VT	192.3	256
Totals	1,216.0	1,546

2. Outlet -

Crown Point 1,238 sq. mi. 1,441 cfs[1]

E. Precipitation for Lake Champlain:

1. Year of sampling: 39.8 inches[2]
2. Mean annual: 32.3 inches[3]

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[1] Potash, Sundberg, and Henson (1969).
[2] Records from Burlinton, VT weather station.
[3] Henson and Potash (1969).

IV. LAKE WATER QUALITY SUMMARY

EPA field staff sampled 13 stations in Lake Champlain during the spring, summer, and fall seasons of 1972. Dates for each of the three samplings were June 1 - 2, July 30 - August 2, and October 5 - 8. Approximate locations of the sampling sites are depicted on the maps, on pages x and xi. Specific locations and depth characteristics of each station from the southern to the northern end of Lake Champlain were as follows. The complete set of lake data for each station is in Appendix C of this report.

Station 500101: located in South Bay, one mile south of bridge; maximum depth of 19 feet (Latitude 43°33'10"N, Longitude 73°27'00"W).

Station 500102: located in the combined Delaware-Champlain Canal: Poultney River channel, just east of confluence with South Bay Portal; maximum depth of 20 feet (Latitude 43°34'55"N, Longitude 73°25'20"W).

Station 500103: located in mid-lake, due west of the marina on east shore and south of Fort Ticonderoga; maximum depth of 22 feet (Latitude 43°49'54"N, Longitude 73°23'17"W).

Station 500104: located in mid-lake, off Putts Point near Buoy 34; maximum depth of 25 feet (Latitude 43°57'28"N, Longitude 73°24'25"W).

Station 500105: located near Port Henry, due north of point on the west side of the lake; maximum depth of 21 feet (Latitude 44°03'10"N, Longitude 73°27'01"W).

Station 500106: located in North West Bay, near Westport; maximum depth of 51 feet (Latitude 44°11'25"N, Longitude 73°25'51"W).

Station 500112: located at mouth of Farm Town Bay, midway between Thompson Point and Long Point; maximum depth of 38 feet (Lattude 44°15'42"N, Longitude 73°17'38"W).

Station 500107: located approximately 2 miles due west of mouth of Winooski River; maximum depth of 120 feet (Latitude 44°31'00"N, Longitude 73°19'00"W).

Station 500109: located approximately one mile due east of mouth of the Ausable River; maximum depth of 116 feet (Latitude 44°33'17"N, Longitude 73°24'43"W).

Station 500108: located approximately one mile south of the southeastern tip of South Hero Island in the Malletts Bay area; maximum depth of 80 feet (Latitude 44°34'30"N, Longitude 73°16'48"W).

Station 500110: located in the center of Cumberland Bay, near Bouy No. 1; maximum depth of 24 feet (Latitude 44°41'49"N, Longitude 73°26'10"W).

Station 500111: located in the northeast portion of Lake Champlain, midway between Point Hill and Butler Island; maximum depth of 21 feet (Latitude 44°48'00"N, Longitude 73°12'30"W).

Station 500113: located in mid-lake, due west of Point au Fer; maximum depth of 25 feet (Latitude 44°56'25"N, Longitude 73°20'13"W).

A. Physical and Chemical Characteristics:

To briefly summarize the grouping of stations according to the morphometry of the lake, stations 500101, -02, -03, and -04 were located in South Lake Champlain (south of Crown Point); stations 500105, -06, -12, -07, -09, -10, and -13 were located in the main lake between Port Henry and Rouses Point; station 500108 was located in the Malletts Bay area; and station 500111 was located in the northeastern portion of Lake Champlain.

To simplify the presentation and discussion of the results of lake sampling, data from stations which were related geographically or morphometrically are grouped. For each grouping, a summary table is provided which gives maximum, minimum, and mean values of all observations at the grouped stations and mean values for each sampling date.

The mean parameter values presented in the tables are not volume-weighted to account for differences in nutrient levels occurring in the various layers of the lake during stratification. Nevertheless, the mean values are useful as a general guide to differences in water quality between areas.

Table 1 summarizes the combined data for stations 500101, -02, -03, and -04, all of which were located in South Lake Champlain.

Secchi disc transparencies in South Lake Champlain were low during EPA visits in 1972 with a maximum depth of 52 inches in Ticonderoga Bay, which may have been caused by the diluting effect of the discharge through the Lake George outlet, and a minimum of 3 inches. Observations by the field staff indicate the turbidity was caused primarily by suspended sediments although some surface algae were also evident. Hensen and Potash (op. cit.) stated that South Lake Champlain was characteristically turbid, apparently due to natural shoreline erosion.

The chemical data indicated that nitrogen and phosphorus were relatively abundant in waters of the South Lake and, particularly, that the contribution from the Delaware-Champlain Canal and Poultney River system was rich in nutrients. The availability of nutrients in South Lake was not matched by correspondingly high chlorophyll a values during EPA samplings--probably due to the high turbidity which prevented plankton blooms from developing;

TABLE 1

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
For EPA Stations 500101, 02, 03 and 04
(See Appendix C for complete data)

	MEAN VALUES		
	1ST SAMPLE 6/ 1/72	2ND SAMPLE 8/ 2/72	3RD SAMPLE 10/ 8/72
TEMP (CENT)	17.7	22.9	14.3
DISS OXY (MG/L)	9.3	7.1	9.4
CNDCTVY (MCROMO)	153.	194.	210.
PH (STAND UNITS)	7.5	7.6	7.8
TOT ALK (MG/L)	58.	70.	71.
TOT P (MG/L)	0.020	0.040	0.085
DISS P (MG/L)	0.011	0.018	0.029
NO2+NO3 (MG/L)	0.130	0.174	0.162
AMMONIA (MG/L)	0.064	0.109	0.114
INORG N (MG/L)	0.194	0.283	0.277
CHLRPHYL (UG/L)	7.2	7.0	16.0
SECCHI (INCHES)	34.	38.	11.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	MEAN FOR ALL SAMPLES
TEMP (CENT)	9.0	23.9	18.6
DISS OXY (MG/L)	5.6	11.2	8.5
CNDCTVY (MCROMO)	90.	245.	188.
PH (STAND UNITS)	6.8	8.1	7.6
TOT ALK (MG/L)	26.	91.	67.
TOT P (MG/L)	0.012	0.188	0.050
DISS P (MG/L)	0.006	0.071	0.020
NO2+NO3 (MG/L)	0.010	0.440	0.158
AMMONIA (MG/L)	0.010	0.220	0.098
INORG N (MG/L)	0.020	0.580	0.256
CHLRPHYL (UG/L)	1.5	30.2	10.1
SECCHI (INCHES)	3.	52.	28.

however, during August and September of 1972, algal blooms were observed by staff of the Vermont Department of Water Resource and T. W. Beak Consultants, Limited. The algal genera Aphanizomenon and Melosira predominated on those occasions.

Station 500104, the deepest EPA station in the South Lake, was stratified during the June, 1972 sampling; however, there was no apparent oxygen depletion in the hypolimnion at that time. During the August sampling at station 500104, stratification was not as pronounced, indicating that the shallow depth of the South Lake permits periodic mixing to occur throughout the summer.

In summary, the South Lake area can be characterized as generally having poorer water quality than other areas of the lake as evidenced by high phosphorus concentrations and low Secchi disc readings. South Lake Champlain has the characteristics of a eutrophic water body although primary productivity is apparently suppressed by the high turbidities which occur in that portion of the lake. South Lake Champlain waters, which are relatively high in phosphorus, could conceivably stimulate primary production in the main lake as the waters mix and the turbidity-causing materials settle. It is also possible, however, that the excessive phosphorus is adsorbed to the silt and becomes unavaiable for algal assimilation when the silt settles to the lake bed.

Table 2 summarizes the data for stations 500105, -06, and -12. Perhaps station 05 should not have been included in this group as the water quality there reflects the South Lake Champlain influence to a great extent because of proximity to Crown Point. Generally speaking, water quality in Lake Champlain between Crown Point and Thompson's Point was much better than in South Lake Champlain. Secchi disc readings ranged from 27 - 144 inches, total phosphorus concentrations did not exceed 0.032 ppm., and there was no evidence of dissolved oxygen depletion in the hypolimnion. One extremely high chlorophyll a value (67.7 μg/l) at station 05 probably resulted from the combination of South Lake Champlain and Port Henry, NY nutrient contributions to the area.

In summary, the area of the lake between Crown Point and Thompson's Point could best be classified as mesotrophic or perhaps mildly eutrophic. Although chlorophyll a values were among the highest measured, there was no evidence of significant dissolved oxygen depletion in the hypolimnion.

Summary data for station 500107, -09, and -10 are presented in Table 3. These stations were all located in the main lake water mass between Schuyler Island and Cumberland Head. Secchi disc readings in this area were relatively high, ranging from 72 to 168 inches and averaging 122 inches. Total phosphorus concentrations were low, averaging only 0.018 ppm in the area. Although the water was thermally stratified at stations 500107 and 500109 during the

TABLE 2

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
For EPA Stations 500105, 06, and 12
(See Appendix C for complete data)

	MEAN VALUES		
	1ST SAMPLE 6/ 1/72	2ND SAMPLE 8/ 2/72	3RD SAMPLE 10/ 8/72
TEMP (CENT)	9.8	17.6	13.7
DISS OXY (MG/L)	12.2	9.3	9.8
CNDCTVY (MCROMO)	126.	154.	153.
PH (STAND UNITS)	7.9	7.9	7.8
TOT ALK (MG/L)	49.	51.	43.
TOT P (MG/L)	0.016	0.021	0.017
DISS P (MG/L)	0.008	0.011	0.009
NO2+NO3 (MG/L)	0.187	0.135	0.123
AMMONIA (MG/L)	0.033	0.059	0.028
INORG N (MG/L)	0.220	0.194	0.151
CHLRPHYL (UG/L)	7.9	29.1	9.5
SECCHI (INCHES)	66.	96.	110.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	MEAN FOR ALL SAMPLES
TEMP (CENT)	5.1	22.8	14.1
DISS OXY (MG/L)	8.1	13.1	10.3
CNDCTVY (MCROMO)	100.	170.	146.
PH (STAND UNITS)	7.2	8.6	7.8
TOT ALK (MG/L)	22.	73.	48.
TOT P (MG/L)	0.011	0.032	0.018
DISS P (MG/L)	0.005	0.017	0.010
NO2+NO3 (MG/L)	0.050	0.310	0.145
AMMONIA (MG/L)	0.010	0.080	0.043
INORG N (MG/L)	0.060	0.380	0.187
CHLRPHYL (UG/L)	1.2	67.7	15.5
SECCHI (INCHES)	27.	144.	91.

TABLE 3

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
For EPA Stations 500107, 09, and 10
(See Appendix C for complete data)

	MEAN VALUES		
	1ST SAMPLE 6/ 2/72	2ND SAMPLE 7/30/72	3RD SAMPLE 10/ 8/72
TEMP (CENT)	11.0	16.6	13.5
DISS OXY (MG/L)	11.6	9.0	9.9
CNDCTVY (MCROMO)	135.	136.	141.
PH (STAND UNITS)	7.9	7.3	7.6
TOT ALK (MG/L)	41.	42.	42.
TOT P (MG/L)	0.020	0.020	0.013
DISS P (MG/L)	0.007	0.011	0.007
NO2+NO3 (MG/L)	0.167	0.154	0.146
AMMONIA (MG/L)	0.030	0.050	0.040
INORG N (MG/L)	0.197	0.204	0.186
CHLRPHYL (UG/L)	16.4	9.2	6.6
SECCHI (INCHES)	90.	128.	156.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	MEAN FOR ALL SAMPLES
TEMP (CENT)	6.0	22.7	14.6
DISS OXY (MG/L)	6.6	12.4	9.7
CNDCTVY (MCROMO)	100.	160.	137.
PH (STAND UNITS)	6.8	8.3	7.5
TOT ALK (MG/L)	29.	48.	42.
TOT P (MG/L)	0.009	0.040	0.018
DISS P (MG/L)	0.005	0.017	0.009
NO2+NO3 (MG/L)	0.060	0.320	0.154
AMMONIA (MG/L)	0.010	0.090	0.043
INORG N (MG/L)	0.090	0.360	0.198
CHLRPHYL (UG/L)	5.4	29.2	11.1
SECCHI (INCHES)	72.	168.	122.

July sampling, there was no evidence of significant oxygen depletion in the hypolimnion. Chlorophyll a values at stations 500107, -09, and -10 averaged somewhat lower than the previous group of stations further south and ranged from 5.4 to 29.2 micrograms/liter with a mean of 11.1 micrograms/liter. Overall the area would be classified as mesotrophic although signs of oligotrophy were also evident.

Table 4 summarizes the data for station 08 in the Mallets Bay area which was sampled only during July and October of 1972. Secchi disc readings at this station were among the highest observed in the entire lake with a maximum reading of 172 inches. Total phosphorus concentrations were low, ranging from 0.007 ppm to 0.021 ppm and averaging 0.012 ppm. Specific conductance was also somewhat less at this location than other sites on the lake with a mean of 106 micromhos. The lake was stratified in the Malletts Bay area during both the July and October samplings, and dissolved oxygen concentrations in the hypolimnion were approximately 24% of saturation, which is symptomatic of a mesotrophic condition. Settling of previous algal blooms could account for the high Secchi disc readings which were observed. Potash, Sundberg, and Henson (op. cit.) classified the Malletts Bay area as eutrophic and noted that hypolimnetic oxygen concentrations dropped as low as 0.1 mg/l during the summer of 1967.

TABLE 4

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
For EPA Station 500108
(See Appendix C for complete data)

	MEAN VALUES 1ST SAMPLE 7/30/72	 2ND SAMPLE 10/ 5/72
TEMP (CENT)	17.3	13.5
DISS OXY (MG/L)	7.7	7.8
CNDCTVY (MCROMO)	102.	114.
PH (STAND UNITS)	6.9	7.2
TOT ALK (MG/L)	32.	30.
TOT P (MG/L)	0.014	0.009
DISS P (MG/L)	0.010	0.006
NO2+NO3 (MG/L)	0.252	0.200
AMMONIA (MG/L)	0.049	0.044
INORG N (MG/L)	0.301	0.244
CHLRPHYL (UG/L)	4.9	5.5
SECCHI (INCHES)	172.	168.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	[illegible] FOR ALL SAMPLES
TEMP (CENT)	7.5	23.2	15.9
DISS OXY (MG/L)	2.4	9.8	7.7
CNDCTVY (MCROMO)	100.	123.	106.
PH (STAND UNITS)	6.4	7.4	7.0
TOT ALK (MG/L)	27.	36.	31.
TOT P (MG/L)	0.007	0.021	0.012
DISS P (MG/L)	0.005	0.013	0.009
NO2+NO3 (MG/L)	0.150	0.400	0.232
AMMONIA (MG/L)	0.030	0.070	0.047
INORG N (MG/L)	0.190	0.440	0.279
CHLRPHYL (UG/L)	4.9	5.5	5.2
SECCHI (INCHES)	168.	172.	170.

Table 5 summarizes the data from station 500111 in the northeast arm of Lake Champlain. Total phosphorus concentrations averaged higher in this area than for all other Champlain stations except for those in South Lake. Secchi disc readings were generally high with summer and spring values of 168 and 178 inches respectively.

Station 500111 was shallow and was not stratified during the 1972 sampling dates. A significant difference between station 500111 and the other sampled areas of the lake was the low inorganic nitrogen concentrations. Mean inorganic nitrogen values were approximately 41% of the lowest mean observed in any of the other areas. The overall classification in the Northeast area of Lake Champlain is mesotrophic to mildly eutrophic.

Table 6 summarized data from station 13 located in the northwest part of the main water mass of Lake Champlain. This station was relatively shallow (25 feet) and was not stratified during the sampling periods. Total phosphorus concentrations averaged 0.017 ppm and Secchi disc readings were consistently high, ranging from 125 - 168 inches. This area of the lake would be classified as mesotrophic.

Table 7 summarizes the significant mean data parameters for Lake Champlain and assigns a trophic condition to each general

TABLE 5

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
for EPA Station 500111
(See Appendix C for complete data)

	MEAN VALUES 1ST SAMPLE 6/ 2/72	 2ND SAMPLE 7/30/72	 3RD SAMPLE 10/ 5/72
TEMP (CENT)	14.4	22.5	15.5
DISS OXY (MG/L)	11.0	7.2	10.3
CNDCTVY (MCROMO)	130.	130.	131.
PH (STAND UNITS)	8.1	7.7	7.7
TOT ALK (MG/L)	39.	38.	35.
TOT P (MG/L)	0.028	0.030	0.042
DISS P (MG/L)	0.010	0.021	0.034
NO2+NO3 (MG/L)	0.025	0.023	0.043
AMMONIA (MG/L)	0.020	0.040	0.037
INORG N (MG/L)	0.045	0.063	0.080
CHLRPHYL (UG/L)	13.6	11.2	5.5
SECCHI (INCHES)	84.	178.	168.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	MEAN FOR ALL SAMPLES
TEMP (CENT)	14.0	22.7	17.5
DISS OXY (MG/L)	5.2	11.1	9.5
CNDCTVY (MCROMO)	130.	132.	131.
PH (STAND UNITS)	7.5	8.2	7.8
TOT ALK (MG/L)	35.	39.	37.
TOT P (MG/L)	0.024	0.043	0.034
DISS P (MG/L)	0.009	0.035	0.023
NO2+NO3 (MG/L)	0.020	0.050	0.031
AMMONIA (MG/L)	0.020	0.040	0.034
INORG N (MG/L)	0.040	0.090	0.065
CHLRPHYL (UG/L)	5.5	13.6	10.1
SECCHI (INCHES)	84.	178.	143.

TABLE 6

SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA
for EPA Station 500113
(See Appendix C for complete data)

		MEAN VALUES	
	1ST SAMPLE 6/ 2/72	2ND SAMPLE 7/30/72	3RD SAMPLE 10/ 5/72
TEMP (CENT)	12.9	21.4	14.8
DISS OXY (MG/L)	11.8	8.0	10.5
CNDCTVY (MCROMO)	130.	135.	146.
PH (STAND UNITS)	8.2	7.4	7.8
TOT ALK (MG/L)	39.	42.	45.
TOT P (MG/L)	0.015	0.028	0.009
DISS P (MG/L)	0.005	0.015	0.006
NO2+NO3 (MG/L)	0.147	0.053	0.100
AMMONIA (MG/L)	0.060	0.057	0.053
INORG N (MG/L)	0.207	0.110	0.153
CHLRPHYL (UG/L)	10.1	12.3	2.4
SECCHI (INCHES)	125.	132.	168.

	MIN FOR ALL SAMPLES	MAX FOR ALL SAMPLES	MEAN FOR ALL SAMPLES
TEMP (CENT)	12.4	21.8	15.9
DISS OXY (MG/L)	7.8	12.0	10.3
CNDCTVY (MCROMO)	130.	146.	137.
PH (STAND UNITS)	7.2	8.3	7.8
TOT ALK (MG/L)	37.	46.	42.
TOT P (MG/L)	0.006	0.042	0.017
DISS P (MG/L)	0.004	0.019	0.009
NO2+NO3 (MG/L)	0.040	0.150	0.100
AMMONIA (MG/L)	0.050	0.070	0.057
INORG N (MG/L)	0.100	0.220	0.157
CHLRPHYL (UG/L)	2.4	12.3	8.3
SECCHI (INCHES)	125.	168.	142.

TABLE 7

MEAN SUMMARY OF LAKE CHAMPLAIN WATER QUALITY DATA

Parameter (Units)	Stations 500101, -02, -03, -04 (S. Lake Champlain)	Stations 500105, -06, -12	Stations 500107, -09, -10	Station 500108	Station 500111	Station 500113
Conductivity (micromhos)	188	146	137	106	131	137
Total P (mg/1)	0.050	0.018	0.018	0.012	0.034	0.017
Dissolved P (mg/1)	0.020	0.010	0.009	0.009	0.023	0.009
Inorganic N (mg/1)	0.256	0.187	0.198	0.279	0.065	0.157
Chlorophyll a (μg/1)	10.1	15.5	11.1	5.2	10.1	8.3
Secchi disc (inches)	28	91	122	170	143	142
Overall Trophic Condition	Eutrophic	Mesotrophic to mildly eutrophic	Mesotrophic to oligotrophic	Mesotrophic	Mesotrophic to mildly eutrophic	Mesotrophic to oligotrophic

lake area. From an overall standpoint, Lake Champlain waters cover a gamut of trophic conditions ranging from oligotrophic in main lake areas to eutrophic in some embayments and nearshore areas. If one classification were assigned to the entire lake, mesotrophy would be most appropriate.

B. Limiting Nutrient Studies:

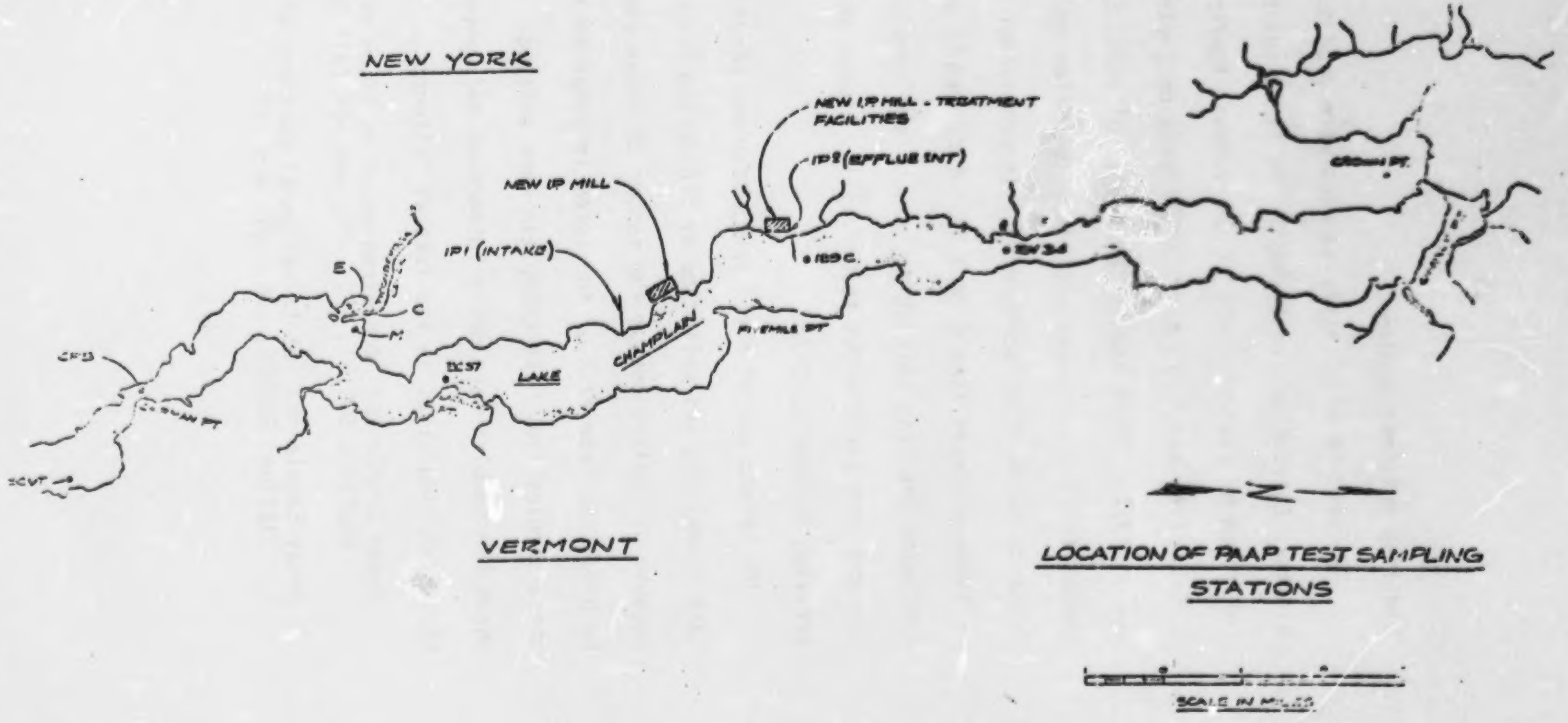
Two sets of algal assay samples were processed by the National Eutrophication Survey. The first set of ten samples was collected by staff members of the Vermont Agency of Environmental Conservation and T. W. Beak Consultants on September 27 and October 3, 1972. These samples were all collected in South Lake Champlain in the general area from two miles south of Chipmans Point to three miles north of the International Paper Company effluent diffuser (see Figure 3). Each sample was frozen and, following the last collection, all of the samples were packed in ice and sent air freight to Corvallis, Oregon on October 3, arriving October 6, 1972.

The second set of algal assay samples, which involved all of Lake Champlain, was collected by EPA during October 5 - 8, 1972. Because of limitations on the number of assay samples which could be processed from each of the lakes included in the Survey, only three samples from Lake Champlain were assayed. Each of the three EPA samples were depth-integrated and composited from multiple sampling sites on the lake as follows:

Assay Sample 72: contained equal portions of water from EPA stations 500101, -02, -03, and -04 (all South Lake Champlain).

Assay Sample 78: contained equal portions of water from EPA stations 500105, -06, -07, and -12.

FIGURE 3


NEW YORK
NEW I.P. MILL - TREATMENT FACILITIES
IP2 (EFFLUE INT)
NEW IP MILL
IP1 (INTAKE)
E
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C
M
CF3
189C.
2W 34
CROWN PT.
FIVEMILE PT
CHAMPLAIN
LAKE
IX 57
VERMONT
N
SCALE IN MILES

LOCATION OF PAAP TEST SAMPLING STATIONS

Assay Sample 66: contained equal portions of water from EPA stations 500108, -11, and -13.

EPA stations 500109 and -10 were not included in any of the assay samples.

The algal assays were generally performed according to the procedures outlined in the Algal Assay Procedure Bottle Test published by EPA (1971). The test organism was the green alga, Selenastrum capricornutum. The cultures were inoculated for two weeks at 24°C with continuous shaking under 400 foot-candles of lighting. Growth of the cultures was monitored by periodic determination of cell numbers with electronic particle counters. Cell numbers were converted to equivalent dry weight values using a predetermined calibration curve.

The growth curves and chemical analyses of both the Vermont and EPA algal assay samples appear in Appendix D.

The results of the Vermont samples from South Lake Champlain will be discussed first. These results are summarized in Table 8 which (1) identifies the sample, (2) indicates the treatment given to the sample, (3) lists available nutrient concentrations at the time the growth period started, and (4) lists the algal yield in terms of mg/l dry cell weight at the conclusion of the 14 day incubation period. The results are presented in the general order of sample site location from the southernmost sampling site to the northernmost sampling site.

There was laboratory error in the preservation of subsamples taken for chemical analysis from the original Vermont samples (see Appendix E for Gakstatter Memo of February 1, 1973). The preservation error could well have influenced the concentration values for orthophosphate and inorganic nitrogen given in Table 8 although the assay response should not have been affected.

The samples, for which assay results are given in Table 8, were autoclaved and filtered before spiking with nutrients or inoculation with the test organism. Autoclaving served the function of resolubilizing the maximum amount of nutrients which were bound in cellular material or detritus so that these nutrients were available for growth during the assay. The filtration procedure which followed autoclaving was simply a method for removing residual cellular and detrital material which would interfere with the electronic particle counter method of monitoring growth of the test organisms.

As indicated in Table 8, the results demonstrated that, with only one exception, growth was limited by phosphorus in the samples collected from South Lake Champlain on September 27 and October 3, 1972. The exception was the sample collected from station 11 for which the assay indicated limitation by nitrogen. While the samples collected from stations E and 189 B only responded to additions of phosphorus and nitrogen together, productivity under such conditions could be limited by controlling phosphorus.

TABLE 8

Algal Assay Response for the Samples Collected From South Lake Champlain by Vermont and T.W. Beak Consultants Limited

Part A: Autoclaved and filtered before nutrient spikes -

Spike	Ortho P Conc (mg/l)	Inorganic N Conc (mg/l)	Maximum yield (mg/l-dry wt.)
(Station SCVT)			
Control	0.001	0.038	0.2
10.0 N			0.2
0.06 P			0.7
0.06 P + 10.0 N			16.6
(Station CPB)			
Control	0.011	0.070	8.0
10.0 N			6.5
0.06 P			24.7
0.06 P + 10.0 N			29.2
(Station E)			
Control	0.039	0.119	1.3
10.0 N			1.6
0.06 P			1.9
0.06 P + 10.0 N			14.7
(Station C)			
Control	0.018	0.123	0.2
10.0 N			0.2
0.06 P			1.4
0.06 P + 10.0 N			26.4
(Station M)			
Control	0.009	0.092	2.1
10.0 N			13.3
0.06 P			1.8
0.06 P + 10.0 N			46.0
(Station IPC-1)			
Control	0.003	0.064	0.2
10.0 N			0.2
0.06 P			1.1
0.06 P + 10.0 N			25.2
(Station IPC-2)			
Control	0.044	0.726	0.2
10.0 N			0.3
0.06 P			0.6
0.06 P + 10.0 N			25.1
(Station Buoy 189B)			
Control	0.020	0.294	4.8
10.0 N			5.3
0.06 P			5.1
0.06 P + 10.0 N			36.2
(Station Buoy 34)			
Control	0.018	0.234	0.4
10.0 N			0.4
0.06 P			1.6
0.06 P + 10.0 N			29.1

TABLE 8
(Page 2)

Part B: Filtered before nutrient spiked -

Spike	Ortho Conc (mg/l)	Inorganic N Conc (mg/l)	Maximum yield (mg/l-dry wt.)
	(Station SCUT)		
Control	0.002	0.073	0.2
10.0 N			0.2
0.06 P			0.3
0.06 P			31.2
	(Station CPB)		
Control	0.001	0.022	0.4
10.0 N			0.4
0.06 P			21.2
0.06 P + 10.0 N			22.4
	(Station E)		
Control		Contaminated	
0.06 P		No result	
0.06 P + 10.0 N			
	(Station C)		
Control	0.066	0.145	0.3
10.0 N			0.6
0.06 P			0.3
0.06 P + 10.0 N			13.5
	(Station M)		
Control	0.012	0.049	1.7
10.0 N			3.2
0.06 P			2.2
0.06 P + 10.0 N			17.6
	(Station Buoy 37)		
Control	0.009	0.019	0.6
10.0 N			0.8
0.06 P			1.4
0.06 P + 10.0 N			35.7
	(Station IPC-1)		
Control	0.002	0.047	2.3
10.0 N			2.0
0.06 P			4.1
0.06 P + 10.0 N			30.4
	(Station IPC-2)		
Control	0.010	0.775	0.2
10.0 N			0.1
0.06 P			0.2
0.06 P + 10.0 N			11.0
	(Station Buoy 189B)		
Control	0.012	0.287	3.3
10.0 N			3.8
0.06 P			7.1
0.06 P + 10.0 N			38.8
	(Station Buoy 34)		
Control	0.005	0.156	0.7
10.0 N			1.5
0.06 P			0.5
0.06 P + 10.0 N			6.2

The results of the three EPA composite algal assay samples are summarized in Table 9. Each of the samples were autoclaved and filtered prior to nutrient addition and inoculation with the test organism.

As indicated by Table 9, the algal assay results for all three of the EPA samples indicated that primary productivity in the samples at the time of assay was limited by phosphorus. Maximum yields were not increased above control values when only nitrogen was added but yields were significantly increased above control values by the addition of phosphorus alone.

In summary, samples collected by Vermont and EPA which were assayed by the bottle test using the green alga, Selenastrum capricornutum, indicated that phosphorus was the nutrient which was limiting to primary productivity in both South Lake Champlain and Lake Champlain in its entirety.

To a limited degree, the algal assay test gives a relative comparison of potential productivity of different waters. This information is provided by the autoclaved-filtered control which permits growth of the test organism to the extent of nutrient availability in the lake water.

In the algal assays of 206 lakes which the National Eutrophication Survey has conducted to date, the productivity range of the controls was very large. The most oligotrophic water bodies yielded less than 0.1 mg/l dry cell weight after 14 days incubation while the richest water body yielded more than 248 mg/l after the same growth period. Although the relationship between assay yield and trophic state has not been clearly defined, Miller (1974) has developed some tentative guidelines from his study of 49 American lakes. Miller reported that (1) control yields ranging from 0 - 0.1 mg/l corresponded to low productivity (oligotrophic) lakes, (2) control yields of 0.11 - 0.8 mg/l corresponded to moderate productivity (mesotrophic) lakes, (3) control yields of 0.81 - 6.0 corresponded to moderately high productivity (eutrophic) lakes and (4) control yields of 6.1 - 20 corresponded to high productivity (eutrophic) lakes. The control yield values cited above represent lake conditions where planktonic algae and not aquatic macrophytes dominate primary production.

According to the above guidelines, the South Lake Champlain and Lake Champlain assay samples represented primarily moderate to moderately high productivity which corresponds to mesotrophic or mildly eutrophic conditions.

TABLE 9

ALGAL ASSAY RESPONSE FOR THE SAMPLES COLLECTED BY EPA FROM LAKE CHAMPLAIN

Station Identification and Concentrations of Ortho-Phosphorus (OP) and Inorganic Nitrogen (IN) in Controls	Maximum Cell Yield (mg/l dry cell wt.) of *Selenastrum capricornutum* for Autoclaved-Filtered Samples After 14 Days Incubation for Each of the Indicated Nutrient Additions				Limiting Nutrient Indicated by Assay
	Control	0.06 ppm OP	10.0 ppm IN	0.06 ppm OP plus 10.0 ppm IN	
Sample #72 composite of Stations 01, 02, 03, & 04 0.012 ppm OP 0.234 ppm IN	1.0	6.5	0.7	30.4	Phosphorus
Sample #78 composite of Stations 05, 06, 07, & 12 0.006 ppm OP 0.186 ppm IN	0.1	5.3	0.1	23.3	Phosphorus
Sample #66 composite of Station 08, 11, & 13 0.015 ppm OP 0.154 ppm IN	3.0	5.3	2.2	25.8	Phosphorus

V. NUTRIENT LOADINGS

A. Introduction:

One of the objectives of the National Eutrophication Survey was to estimate nutrient inputs to each studied lake and to determine the relative percentage of the total input which originated from point waste sources. To meet this objective for Lake Champlain, a sampling program was initiated utilizing the volunteer services of both the Vermont and New York National Guard organizations.

National Guard sampling teams from both States collected monthly samples from pre-selected stream sites, preserved the samples with mercuric chloride, and shipped them to the Pacific Northwest Environmental Research Laboratory in Corvallis, Oregon, for the analysis of nitrogen and phosphorus constituents. Sampling of Vermont streams was started in July, 1972, and New York streams were started in November, 1972.

Nutrient concentrations used in loading calculations for New York streams were based on monthly stream samples collected from November, 1972 through July, 1973. For Vermont streams the sampling period was July, 1972 through June, 1973.

Stream flow estimates, which are necessary to calculate total nutrient loads delivered to a lake, were provided by the New York and New England District Offices of the U.S. Geological Survey.

U.S.G.S. also provided the majority of the data on the drainage areas of various stream systems.

Phosphorus loadings were calculated for the entire Lake Champlain water body, which includes the South Lake area, and separately for only that portion of the lake designated as South Lake Champlain.

B. Point Nutrient Sources:

1. Domestic -

Tables 10 and 11 list domestic waste sources in the Lake Champlain watershed from the States of New York and Vermont respectively. Also provided in the Tables are (1) the population served by each system, (2) the type of treatment, if any, (3) the estimated annual discharges of total phosphorus and total nitrogen by each facility, (4) the name of the river or stream which ultimately delivers the nutrients to Lake Champlain, and (5) the approximate watercourse mileage of the discharges from Lake Champlain. For each State, the discharges are listed in the order of river basin from the northern to southern end of the lake.

The raw waste loadings of phosphorus and nitrogen to each facility were estimated on the basis of annual contributions of 3.2 pounds total phosphorus per capita (Hetling and Carcich, 1972) and 9.4 pounds of total nitrogen per capita. For facilities providing either primary or primary plus secondary treatment, the assumption was made that approximately 22% of the total phosphorus (Bartsch, 1972) and 20% of the total nitrogen was removed. Therefore, if the facility provided any type of treatment, the discharge was estimated to contribute 2.5 pounds of total phosphorus per capita per year and 7.5 pounds of total nitrogen per capita per year. For 12 of the plants, nitrogen and phosphorus loads were estimated on the basis of the analysis of composited effluent samples. The sampled plants are noted in Tables 10 and 11.

Estimates of populations served in each community for the State of New York were taken from the EPA STORET System Municipal Waste Facilities Inventory and from State Inventory Data provided by New York. Population estimates for Vermont communities were obtained directly from staff of the Vermont Agency of Environmental Conservation.

For both States, only those communities which were partially or completely sewered and which had a direct discharge of either treated or untreated wastes to surface waters were considered.

A total New York population of 84,773 was served by systems discharging directly to surface waters in the Lake Champlain drainage basin (Table 10). On an annual basis these discharges contributed 218,410 pounds of total

TABLE 10

DOMESTIC WASTE DISCHARGES* AND NUTRIENT LOADS** TO LAKE CHAMPLAIN BASIN SURFACE WATERS FROM NEW YORK

Municipality Facility Name	Population Served	Treatment Type	Total Phosphorus Discharged lbs/year*	Total Nitrogen Discharged lbs/year	Receiving Drainage Basin	Approximate Water Course Mileage from Lake Champlain
Rouses Point	2,160	Primary	55,400	16,200	Lake Champlain	direct
Plattsburg Town	1,000	Primary	2,500	7,500	Lake Champlain	direct
Westport	700	Secondary	1,750	5,250	Lake Champlain	direct
Port Henry	1,800	Primary	4,500	13,500	Lake Champlain	direct
Champlain Village	1,550	Primary	3,880	11,620	Great Chazy	7
Saranac Lake Village	6,915	Primary	17,290	51,860	Saranac River	55
Bloomingdale	400	None	1,280	3,760	Saranac River	45
Dannemora Prison	3,300	Primary	8,250	24,750	Saranac River	20
Morrisonville	5,300	None	16,960	49,820	Saranac River	7
Dannemora Village	1,800	Primary	4,500	13,500	Saranac River	20
Plattsburg***	30,000	Primary	86,770	375,370	Saranac River	<1
Peru	2,800	Primary	7,000	21,000	Little Ausable	5
Lake Placid	3,000	Primary	7,500	22,500	Ausable River	39
Ausable Forks	500	None	1,600	4,700	Ausable River	18
Keesville	2,000	Secondary	5,000	15,000	Ausable River	6
Moriah S.D. #1	270	Primary	680	2,020	Mill Brook	4
Moriah S.D. #2	2,900	Primary	7,250	21,750	Mill Brook	2
Ticonderoga Village	3,268	None	10,460	30,720	Ticonderoga Creek	2
Granville	2,784	Primary	6,960	20,880	Barge Canal	19
Fort Ann	562	Primary	1,400	4,220	Barge Canal	13
Comstock Prison	1,700	None	5,440	15,980	Barge Canal	13
Whitehall	3,764	None	12,040	35,380	Barge Canal	2
Totals	84,773		218,410	767,280		

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* Loading values were estimated on basis of population served. Estimates for untreated waste are 3.2 lbs total P/capita/year and 9.4 lbs total N/capita/year and for treated wastes 2.5 lbs total P/capita/year and 7.5 lbs N/capita/year.

** All values given are prior to NY phosphate detergent ban.

*** Loadings determined by sampling old plant, NEW secondary treatment facility now in operation.

phosphorus and 767,280 pounds of total nitrogen to the basin prior to the New York ban on phosphate laundry detergents. After the phosphate ban became effective (July 1, 1973), the New York phosphorus load would theoretically have been reduced by 50% to approximately 109,000 pounds/year while the nitrogen load would have been unaffected.

A total Vermont population of 164,738 was served by systems discharging directly to surface waters in the Lake Champlain drainage basin (Table 11). Annually, these discharges contributed an estimated 444,410 pounds of phosphorus and 1,465,930 pounds of nitrogen to the basin.

Table 12 summarizes domestic nutrient contributions to Lake Champlain by river basin from both New York and Vermont. Also tabulated separately in Table 12 are total pounds of phosphorus discharged from point sources within approximately 25 river miles of Lake Champlain. The total point source phosphorus loading in the basin from both states, prior to the New York phosphate ban, was 662,820 pounds of which 409,650 pounds was discharged within 25 miles of the lake. The total nitrogen loading in the basin from domestic sources in New York and Vermont was 2,233,210 pounds per year.

2. Industrial Sources -

The only major industrial nutrient source known to be discharging directly to Lake Champlain is the International

TABLE 11

DOMESTIC WASTE DISCHARGES AND NUTRIENT LOADS* TO LAKE CHAMPLAIN BASIN SURFACE WATERS FROM VERMONT

Municipality Facility Name	Population Served	Treatment Type	Total Phosphorus Discharged lbs/year		Total Nitrogen Discharged lbs/year	Receiving Drainage Basin	Approximate Water Course Mileage from Lake Champlain
Alburg	480	Secondary	1,200		3,600	Lake Champlain	direct
Burlington (Main)**	21,500	Secondary	49,450		198,120	Lake Champlain	direct
Shelburne F.D. #1	1,328	Secondary	3,320		9,960	Lake Champlain	direct
South Burlington (Bartletts)**	1,000	Primary	7,810		14,910	Lake Champlain	direct
Troy	36	None	120		340	Missisquoi River	54
North Troy	232	None	12,600	(1)	18,790	Missisquoi River	51
Fairfield	182	None	580		1,710	Missisquoi River	40
Richford	1,497	Secondary	3,740		11,230	Missisquoi River	36
Enosburg Falls	1,400	None	27,200	(2)	45,000	Missisquoi River	27
Sheldon	280	None	900		2,630	Missisquoi River	12
Swanton	2,630	Secondary	6,580		19,720	Missisquoi River	6
St. Albans Corr. Institute	45	Primary	110		340	Stevens Brook	4
St. Albans	9,000	Secondary	22,500		67,500	Stevens Brook	4
Hardwick	1,540	None	4,930		14,480	Lamoille River	72
Morrisville	2,148	None	6,870		20,190	Lamoille River	42
Hyde Park	550	None	1,760		5,170	Lamoille River	40
Cambridge	220	None	700		2,070	Lamoille River	34
Johnson	1,200	Secondary	3,000		9,000	Lamoille River	36
Fairfax	132	Secondary	330		990	Lamoille River	20
Milton	778	None	10,870	(3)	15,180	Lamoille River	10
Barre City	10,575	Primary	26,250		78,750	Winooski River	63
Northfield	3,300	Secondary	8,250		24,750	Winooski River	62
East Barre	4,430	Primary	11,080		33,220	Winooski River	65
Berlin	1,500	Secondary	3,750		11,250	Winooski River	60
Plainfield	949	Secondary	2,370		7,120	Winooski River	68
Williams Town	510	Secondary	1,280		3,820	Winooski River	67
Montpelier	8,860	Primary	22,150		66,450	Winooski River	56
Stowe	1,760	None	5,630		16,540	Winooski River	53
Waterbury	2,800	Secondary	7,000		21,000	Winooski River	44

TABLE 11
(Page 2)

Municipality Facility Name	Population Served	Treatment Type	Total Phosphorus Discharged lbs/year	Total Nitrogen Discharged lbs/year	Receiving Drainage Basin	Approximate Water Course Mileage from Lake Champlain
Waterbury State Hosp.	860	Primary	2,150	6,450	Winooski River	44
Richmond	926	Secondary	2,320	6,940	Winooski River	30
Williston	300	None	960	2,820	Winooski River	23
Essex Junction**	6,250	Primary	12,570	54,660	Winooski River	17
Essex Junction IBM**	875	Secondary	2,010	109,630	Winooski River	17
Marshfield	322	None	1,030	3,030	Winooski River	15
Winooski	7,400	Secondary	18,500	55,500	Winooski River	11
Essex Town	1,000	Primary	2,500	7,500	Winooski River	11
Burlington Riverside**	9,000	Secondary	4,430	17,040	Winooski River	11
Colchester F.D. #1**	2,200	Secondary	2,050	5,180	Winooski River	11
Burlington North End**	7,000	Secondary	21,500	84,610	Winooski River	9
South Burlington Arpt. Parkway**	5,600	Primary	15,450	63,610	Winooski River	10
Hinesburg	350	Secondary	3,820 (4)	6,750	LaPlatte River	10
Shelburne F.D. #2**	800	Primary	2,380	10,020	LaPlatte River	4
Wallingford	580	None	1,860	5,450	Otter Creek	82
West Rutland	2,250	Secondary	5,620	16,880	Otter Creek	72
Rutland City	19,093	Primary	47,730	143,200	Otter Creek	72
Rutland Town	280	Primary	700	2,100	Otthr Creek	72
Proctor	1,980	Primary	4,950	14,850	Otter Creek	64
Pittsford	640	Secondary	1,600	4,800	Otter Creek	60
Brandon	2,700	None	8,640	25,380	Otter Creek	51
Brandon Training School	900	Secondary	2,250	6,750	Otter Creek	51
Middlebury**	3,840	Primary	8,470	34,300	Otter Creek	25
Vergennes	1,970	Primary	4,920	14,780	Otter Creek	7
Benson	120	None	380	1,130	Poultney River	18
Poultney	2,125	Secondary	5,310	15,940	Poultney River	16

TABLE 11
(Page 3)

Municipality Facility Name	Population Served	Treatment Type	Total Phosphorus Discharged lbs/year	Total Nitrogen Discharged lbs/year	Receiving Drainage Basin	Approximate Course Mileage from Lake Champlain
Castleton**	1,715	Secondary	1,040	2,070	Poultney River	14
Fairhaven	2,450	Secondary	6,120	18,380	Poultney River	11
West Pawlet	250	None	800	2,350	Barge Canal	24
Totals	164,738		444,410	1,465,930		

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(1) Includes 32.5 lbs P/day from United Farmers and Kraft Cheese.
(2) Includes 62.3 lbs TP/day from Yankee Milk (38) and Franklin Cheese (24.3).
(3) Includes 8,380 lbs TP and 11,730 lbs TN from creamery.
(4) Load includes creamery waste (8.1 lbs/day - 2,947 lbs/year).
* Loadings were estimated on the basis of population served except of those plants which were sampled.
** Loadings based on sample data.

TABLE 12

QUANTITIES OF NITROGEN AND PHOSPHORUS DISCHARGED TO MAJOR TRIBUTARIES FROM POINT WASTE SOURCES

Tributary Name	Total Phosphorus* Discharged from Point Waste Sources to Tributary System lbs P/year	Total Phosphorus* Discharged from Point Waste Sources Within 25 Miles of Lake Champlain lbs P/year	Total Nitrogen Discharged from Point Waste Sources to Tributary System lbs N/year
Direct to Lake Champlain	75,930	75,930	269,040
Barge Canal - Poultney River System	39,490	39,490	116,330
Otter Creek	86,740	13,390	268,490
LaPlatte River	6,200	6,200	16,770
Winooski River	173,230	81,000	679,870
Lamoille River	28,460	11,200	67,080
Stevens Brook	22,610	22,610	67,840
Missisquoi River	51,740	7,480	99,420
Great Chazy River	3,880	3,880	11,620
Saranac River	135,050	116,480	519,060
Little Ausable River	7,000	7,000	21,000
Ausable River	14,100	6,600	42,200
Mill Brook	7,930	7,930	23,770
Ticonderoga Creek	10,460	10,460	30,720
Totals	662,820	409,650	2,233,210

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*Prior to New York phosphate laundry detergent ban.

Paper Company (IPC) facility near Ticonderoga, New York.

Flow data for the mill effluent and phosphorus concentrations in the effluent for all of 1972 and January through June of 1973 were supplied by the New York Department of Environmental Conservation (see Appendix F). Based on these data, the average annual loading to South Lake Champlain from the mill effluent was 24,090 pounds of total phosphorus.

In discussions with staff members of the Vermont Agency of Environmental Conservation it was indicated there was a question concerning sample processing prior to phosphorus analysis--specifically whether or not the samples were filtered prior to analysis. If the mill effluent samples were filtered prior to analysis, the phosphorus loading of 24,090 pounds/year would be a low estimate and would represent total dissolved phosphorus rather than total phosphorus.

No specific data were obtained for total nitrogen loadings from the IPC facility; therefore, the loading figure of 386,900 pounds/year reported by T. W. Beak Consultants was used as the estimated contribution from IPC.

C. Annual Total Phosphorus Loadings to Lake Champlain:

Table 13 lists the annual phosphorus input to Lake Champlain by major sources which includes (1) tributaries sampled by the

TABLE 13

PHOSPHORUS LOADING TO LAKE CHAMPLAIN
(Before New York Phosphate Laundry Detergent Ban)

I. Inputs

Source	lbs P/year	% of total
A. Sampled Tributaries[1] -		
Missisquoi River	138,800	10.5
Stevens Brook	23,[illegible]0	1.8
Lamoille River	72,650	5.5
Malletts Creek	2,750	0.2
Winooski River	209,640	15.9
LaPlatte River	17,780	1.3
Otter Creek	187,800	14.2
Barge Canal - Poultney River	135,970	10.3
Ticonderoga Creek	13,830	1.0
Fivemile Creek	1,340	0.1
Putnam Creek	3,370	0.3
McKenzie Brook	580	<0.1
Mill Brook	4,570	0.3
Hoisington Brook	1,090	0.1
Bouquet River	32,070	2.4
Ausable River	32,730	2.5
Little Ausable River	11,860	0.9
Salmon River	3,450	0.3
Saranac River	130,190	9.9
Little Chazy River	8,980	0.7
Great Chazy River	35,640	2.7
Tributary sub-total	(1,068,820)	(81.0)
B. Minor tributaries and immediate drainage[2]	126,570	9.6
C. Municipal STP's direct to lake (8)	75,930	5.8
D. Industries direct to lake (1)	24,090	1.8
E. Direct precipitation[3]	23,140	1.8
Totals	1,318,650	100.0

2. Output[4]

Richelieu River	652,720

3. Net Annual P Accumulation 665,930 lbs.

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1. Tributary load includes point sources.
2. Drainage area of 1,195 sq. mi. and average load of 106 lbs. Total P/sq. mi./year.
3. Used value determined by RPI for Lake George (52.6 lbs Total P/sq. mi./year), Aulenbach (1972).
4. Mean total phosphorus concentration of EPA station 500171 used for calculation. Average Richelieu River discharge of 11,052 cfs from Henson and Potash (1969).

National Eutrophication Survey--accounting for 6,549 square miles of the total Champlain land drainage of 7,744 square miles, (2) unsampled minor tributaries and immediate drainage to Lake Champlain which includes the remaining 1,195 square miles of Lake Champlain drainage, (3) eight municipal sewage effluents which discharge directly to Lake Champlain, (4) one industrial discharge directly to Lake Champlain, and (5) phosphorus contributed directly to the lake in precipitation.

The data in Table 13 indicate that 81.0% of the total phosphorus load to Lake Champlain is input via the sampled tributary streams. The total phosphorus load carried by the sampled tributaries includes not only phosphorus from land runoff but also that discharged from municipalities in treated and untreated wastewater. The problem is to determine the percentage of total phosphorus load in the sampled tributary streams which originate from the point waste sources.

Because of the magnitude of the Champlain drainage basin, and the fact that multiple waste sources are located on some of the streams, it is not feasible to calculate specifically the percentage of total phosphorus originating from each of the point waste sources. It is, however, possible to make some reasonable estimates of the significance of point source input to Lake Champlain.

Table 14 summarizes the phosphorus and nitrogen loads discharged to Lake Champlain by each sampled tributary and also shows the total point source nutrient discharges to each tributary system. If the assumption were made that all phosphorus discharged from point sources to tributaries in the Lake Champlain Basin reached the lake, then 55% of the total tributary load and 52% of the total phosphorus load to Lake Champlain could be attributable to point sources (domestic and industrial). This would be the extreme case since it is unlikely that all of the phosphorus discharged from facilities located up to 82 river miles from Lake Champlain would ever reach the lake. Impoundments such as Arrowhead Lake and Lake Lamoille on the Lamoille River and Waterbury Reservoir in the Winooski basin would permanently trap a portion of the phosphorus load carried by the stream. Some of the remaining phosphorus would be assimilated by periphyton and macrophytic plants in the stream or adsorbed to particulate matter in the stream bed, although it can be argued that eventually the phosphorus would move downstream and reach Lake Champlain.

Point waste sources discharging within 25 miles of Lake Champlain account for 63% (433,740 lbs) of the total phosphorus originating from point sources in the entire drainage basin. If it is assumed that only 50% (293,400 lbs/year) of all the point source phosphorus discharged to sampled tributaries reached the

TABLE 14

COMPARISON OF TOTAL NUTRIENTS DISCHARGED TO LAKE CHAMPLAIN BY EACH SAMPLED TRIBUTARY AND NUTRIENTS INPUT TO EACH TRIBUTARY SYSTEM FROM POINT WASTE SOURCES

Tributary System	lbs Total P/year Delivered to Lake Including Point Sources	lbs Total P/year Discharged by Point Sources in Basin	lbs Total N/year Delivered to Lake Including Point Sources	lbs Total N/year Discharged by Point Sources in Basin
Missisquoi River	138,800	51,740	4,053,600	99,420
Stevens Brook	23,730	22,610	79,020	67,840
Lamoille River	72,650	28,460	2,097,840	67,080
Malletts Creek	2,750	0	61,900	0
Winooski River	209,640	173,230	3,599,770	679,870
LaPlatte River	17,780	6,200	127,400	16,770
Otter Creek	187,800	86,740	3,316,300	268,490
Barge Canal - Poultney River	135,970	39,490	2,273,700	116,330
Ticonderoga Creek	13,830	10,460	312,680	30,720
Fivemile Creek	1,340	0	27,030	0
Putnam Creek	3,370	0	163,170	0
McKenzie Brook	580	0	22,160	0
Mill Brook	4,570	7,930	79,920	23,770
Hoisington Brook	1,090	0	28,990	0
Bouquet River	32,070	0	611,930	0
Ausable River	32,730	14,100	1,696,380	42,200
Little Ausable River	11,860	7,000	206,830	21,000
Salmon River	3,450	0	175,950	0
Saranac River	130,190	135,050	1,901,280	519,060
Little Chazy River	8,980	0	189,560	0
Great Chazy River	35,640	3,880	772,400	11,620
Totals	1,068,820	586,890	21,797,810	1,964,170

lake, then point sources (municipal and industrial) would account for approximately 27% of the tributary load and 30% of the total phosphorus load to Lake Champlain.

Taking a different approach to estimate the percentage of total phosphorus loading due to point sources, Table 15 presents the average nutrient contribution from eight tributary systems which receive little or no point source nutrient input. The mean total phosphorus contribution for the eight tributary systems is 106 pounds total phosphorus/square mile/year. Multiplying this factor by the drainage area of sampled tributaries (6,549 square miles) results in an estimated non-point loading of 694,190 pounds P/year with the remaining loading of 374,630 pounds attributable to point source discharges to the tributaries. By this estimate, 35% of the tributary phosphorus load originates from point sources and, including direct municipal and industrial discharge to the lake, 36% of the total loading to Lake Champlain originates from point sources. This method agrees well with the results obtained by assuming that 50% of all point source nutrients discharged to tributaries actually reach the lake.

In summary, using the conservative estimate, approximately 30% of the total phosphorus load to Lake Champlain can be attributed to New York and Vermont point waste sources. This estimate was based on conditions through June, 1973, prior to a New York ban on phosphate laundry detergents.

TABLE 15

ANNUAL PHOSPHORUS AND NITROGEN LOADINGS FROM EIGHT LAKE CHAMPLAIN TRIBUTARIES WHICH RECEIVE NO SIGNIFICANT POINT SOURCE NUTRIENT LOADS

Tributary Name	Drainage Area (sq mi)	Total lbs P/yr	lbs P/ sq mi/yr	Total lbs N/yr	lbs N/ sq mi/yr
Malletts Creek	19.1	2,750	144	61,900	3,241
Fivemile Creek	8.4	1,345	160	27,032	3,218
Putnam Creek	61.3	3,369	55	163,170	2,662
McKenzie Brook	10.3	580	56	22,160	2,151
Hoisington Brook	11.4	1,090	96	28,990	2,542
Bouquet River	278.0	32,070	115	611,930	2,201
Salmon River	66.0	3,450	52	175,950	2,666
Little Chazy River	51.2	8,980	175	189,560	3,702
Mean Nutrient Loads			106 lbs $P/mi^2/yr$		2,798 lbs $N/mi^2/yr$

Effect of Phosphate Detergent Ban

Phosphates in detergents account for approximately 50% of the total phosphorus load in domestic wastewater. In New York, a statewide ban on the sale of phosphate laundry detergents became effective July 1, 1973. Assuming that New York residents in the Champlain drainage basin purchase and use the non-phosphate detergents, a 50% decrease in wastewater phosphorus loads would be expected. The ban, therefore, if effective, would decrease the phosphorus load to Lake Champlain and the percentages of the total load attributed to point sources as indicated in Table 16.

Assuming again that 50% of all point source phosphorus discharged to tributaries reaches Lake Champlain, following the New York ban the total phosphorus load to the lake would decrease to 1,260,510 pounds per year, of which 30% would be from point sources (municipal plus industrial).

If the State of Vermont also initiates a phosphate ban, the total phosphorus load to Lake Champlain would decrease to 1,133,960 pounds per year, of which 18% would originate from point sources (municipal plus industrial).

D. Annual Total Nitrogen Loadings to Lake Champlain:

Table 17 lists the annual total nitrogen input to Lake Champlain by major sources including (1) tributaries sampled by the National Eutrophication Survey which account for 6,549 square miles of the total Champlain land drainage of 7,744 square

TABLE 16

EFFECTS OF PHOSPHATE LAUNDRY DETERGENT BAN ON ANNUAL PHOSPHORUS LOADINGS TO LAKE CHAMPLAIN AND PHOSPHORUS CONTRIBUTIONS FROM POINT WASTE SOURCES

	Total Annual Phosphorus* Loading lbs Total P	Annual Phosphorus* Loading Attributable to All Point Sources lbs Total P (% of Total Load)	Annual Phosphorus* Loading Attributable to NY Point Sources lbs Total P (% of Total Load)	Annual Phosphorus* Loading Attributable to VT Point Sources lbs Total P (% of Total Load)
No Ban on Phosphates	1,318,650	393,460 (30%)	140,270 (11%)	253,100 (19%)
NY Ban on Phosphates	1,260,510	335,320 (27%)	82,230 (7%)	253,100 (20%)
NY and VT Ban on Phosphates	1,133,960	208,770 (18%)	82,230 (7%)	126,550 (11%)

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* Assuming that 50% of all phosphorus discharged to tributaries by point sources reaches Lake Champlain.

TABLE 17

NITROGEN LOADING TO LAKE CHAMPLAIN

1. Inputs

Source	lbs N/year	% of total
A. Sampled Tributaries[1]		
Missisquoi River	4,053,600	14.0
Stevens Brook	79,020	0.3
Lamoille River	2,097,840	7.3
Malletts Creek	61,900	0.2
Winooski River	3,599,770	12.4
LaPlatte River	127,400	0.4
Otter Creek	3,316,300	11.5
Barge Canal - Poultney River	2,273,700	7.9
Ticonderoga Creek	312,680	1.1
Fivemile Creek	27,030	0.1
Putman Creek	163,170	0.6
McKenzie Brook	22,160	0.1
Mill Brook	79,920	0.3
Hoisington Brook	28,990	0.1
Bouquet River	611,930	2.1
Ausable River	1,696,380	5.9
Little Ausable River	206,830	0.7
Salmon River	175,950	0.6
Saranac River	1,901,280	6.6
Little Chazy River	189,560	0.7
Great Chazy River	772,400	2.3
Tributary sub-total	(21,797,810)	(75.2)
B. Minor tributaries and immediate drainage[2]	3,343,610	11.7
C. Municipal STP's direct to lake (8)	269,040	1.0
D. Industries direct to lake (1)	386,900	1.3
E. Direct precipitation[3]	3,131,040	10.8
Totals	28,928,400	100.0

2. Outputs

Richelieu River[4]	21,692,026

3. Net Annual Nitrogen Accumulation 7,236,374 lbs.

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1. Tributary load includes point sources.
2. Drainage area of 1,195 sq. mi. and average load of 2,798 lbs total nitrogen/sq mi/yr.
3. Used value determined by RPI for Lake George (7,100 lbs TN/ sq mi/ yr), Aulenbach (1972).
4. Used mean total nitrogen concentration of EPA station 500171 and average Richelieu River discharge of 11,052 cfs from Henson and Potash (1969).

miles, (2) unsampled minor tributaries and immediate drainage which includes the remaining 1,195 square miles of Champlain drainage, (3) eight municipal sewage discharges which are direct to the lake, (4) one industrial discharge direct to the lake, and (5) nitrogen contributed directly to the lake in precipitation.

The estimated total annual nitrogen loading to Lake Champlain from all major sources is 28,928,400 pounds. Of the total, 75% is input through the sampled tributary streams.

If it is assumed that all nitrogen discharged by point sources reaches Lake Champlain, only about 9% of the total nitrogen input can be attributed to these sources. The remaining 91% of the input results from land runoff and precipitation. Point source nitrogen control from the standpoint of eutrophication would be pointless.

E. South Lake Champlain Phosphorus Loading:

Total phosphorus loadings to South Lake Champlain are presented in Table 18. South Lake tributaries which were sampled by the National Eutrophication Survey included 1,024 square miles or approximately 84% of the entire South Lake drainage area of 1,216 square miles.

The total annual phosphorus input to South Lake prior to the New York ban on phosphate laundry detergents was

TABLE 16

ANNUAL TOTAL PHOSPHORUS LOADING TO SOUTH LAKE CHAMPLAIN
(Before New York Phosphate Laundry Detergent Ban)

1. Inputs

Source		lbs P/year		% of total
A. Sampled Tributary Load, Excluding Point Sources (D.A.)				
Poultney River-Barge Canal (692)		96,480		48.9
Ticonderoga Creek (262)		5,170		2.6
Fivemile Creek (8.4)		1,340		0.7
Putnam Creek (61.3)		3,370		1.7
a. Sub-total	106,360		53.9	
B. Minor tributaries & immediate drainage (DA)				
Crown Point Bridge to East Creek (30.6)[1]		4,220		2.1
East Creek (32.3)[1]		4,460		2.3
East Creek to Poultney River (22.1)[2]		2,320		1.2
Barge Canal to Ticonderoga Creek (93)[3]		4,000		2.0
Putnam Creek to Crown Point (14.3)[4]		790		0.4
b. Sub-total	15,790		8.0	
C. Municipal Wastes				
NY - Fort Ann		1,400		0.7
- Comstock Prison		5,440		2.8
- Granville		6,960		3.5
- Whitehall		12,040		6.1
- Ticonderoga		10,460		5.3
VT - West Pawlet		800		0.4
- Benson		380		0.2
- Castleton		1,040		0.5
- Fairhaven		6,120		3.1
- Poultney		5,310		2.7
c. Sub-total	49,950		25.3	
D. Industrial Wastes				
International Paper Co.[5]		24,090		12.2
E. Direct precipitation[6]		1,160		0.6
Totals		197,350		100.0

2. Output[7]

Crown Point Bridge	123,690

3. Net Annual Phosphorus Accumulation 73,660 lbs.

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[1] Used factor of 138 lbs P/sq mile/year.
[2] Used factor of 105 lbs/sq mile/year.
[3] Used factor of 43 lbs/sq mile/year.
[4] Used factor of 55 lbs/sq mile/year.
[5] Used IPC Mill effluent and NY San. 45 data.
[6] Used same factors as determined for Lake George by RPI Fresh-Water Institute.
[7] Used mean phosphorus concentration for EPA Station 500104 and estimated mean flow of 1,441 cfs (Henson).

estimated to be 197,350 pounds. Of the total, 62% originates from diffuse sources, whereas 38% originates from municipal and industrial point sources which are subject to control. Since all domestic waste discharges are located within 25 miles of the lake, the assumption was made that 100% of the discharged phosphorus eventually reached South Lake Champlain.

Table 19 presents the annual phosphorus loading to South Lake Champlain, by State, prior to the New York ban on phosphate laundry detergents. New York diffuse sources accounted for 27% of the total input and Vermont diffuse sources about 35%. Point waste sources from New York and Vermont accounted for 31% and 7% of the total input, respectively. For all sources, New York contributed 58% of the total and Vermont 42% of the total annual phosphorus input. The International Paper Company, prior to the New York ban, contributed 12% of the total phosphorus to South Lake Champlain.

Table 20 summarizes the phosphorus contributions, by State, after the New York phosphate laundry detergent ban (assuming the ban is 100% effective). Under this condition, the total load to South lake would be reduced to 179,200 pounds/year with all New York sources contributing 54% of the total load and all Vermont sources contributing 46%. With the New York phosphate ban in effect, the International Paper Company contribution would be 13% of the total phosphorus load.

TABLE 19

ANNUAL PHOSPHORUS LOADING TO SOUTH LAKE CHAMPLAIN BY STATE (Before New York Phosphate Laundry Detergent Ban)

Source	lbs P/year	% of total
New York Diffuse Sources	54,080	27
New York Point Sources*	60,390	31
Vermont Diffuse Sources	69,230	35
Vermont Point Sources	13,650	7
Totals	197,350	100

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* Prior to the New York phosphate detergent ban, the International Paper Company phosphorus contribution of 24,090 lbs/year was 12% of the total input.

TABLE 20

ANNUAL PHOSPHORUS LOADING TO SOUTH LAKE CHAMPLAIN BY STATE
(After New York Phosphate Laundry Detergent Ban)

Source	lbs P/year	% of total
New York Diffuse Sources	54,080	30
New York Point Sources*	42,240	24
Vermont Diffuse Sources	69,230	38
Vermont Point Sources	13,650	8
Totals	179,200	100

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* Following the New York Phosphate detergent ban, the International Paper Company phosphorus contribution of 24,090 lbs/year was 13% of the total.

As an approximate check on the reasonability of the South Lake phosphorus loading from diffuse sources, the average phosphorus loading from eight control tributaries (not receiving major point source discharges) to Lake Champlain was 106 pounds P/ square mile/year (see Table 15).

This factor, multiplied by the total South Lake Champlain drainage area of 1,216 square miles, totals 128,900 lbs P/year; this is in very good agreement with the diffuse source load in Table 18 of 123,310 lbs P/year.

F. Relationship Between Nutrient Loading and Trophic Condition:

Based on phosphorus and nitrogen loadings which have been reported in the literature for several European and American lakes of known trophic condition, Vollenweider (1973) established a graphical relationship between annual surface phosphorus loadings, trophic conditions, mean depths, and retention time of lakes. While the validity of the Vollenweider numbers has not been completely established, these numbers are the best presently available and can be used as an additional guideline to relate existing nutrient loadings to ideal loading rates and trophic condition.

Table 21 presents phosphorus loading rates to Lake Champlain for point source phosphorus effluent reductions ranging from the condition prior to the New York ban on phosphate laundry detergents to a situation where all effluent phosphorus from Vermont and New York is reduced by 90% through treatment. Prior to the New York ban on phosphorus laundry detergents, the estimated loading rate to Lake Champlain was 0.53 grams/m^2 lake surface/year which, following the NY ban, would have been reduced to 0.51 grams/m^2/year. If Vermont also imposed a ban on phosphate detergents and the International Paper Company plant reduced phosphorus discharges by 50%, the loading to Lake Champlain would be 0.45 g/m^2/year or approximately 85% of the loading prior to the New York ban. If both states reduced all effluent phosphorus by 80% or by 90% the loadings would be 0.40 and 0.39 g/m^2/year respectively.

The loading data cited in Table 21 are all calculated with the assumption that 50% of the total phosphorus discharged to streams in the Champlain basin eventually reaches the lake. That assumption is not unrealistic because 62% of all tributary point source phosphorus is discharged with 25 miles of Lake Champlain.

According to Vollenweider's relationship between phosphorus loading, mean depth, detention time and hydraulic residence time, a loading of 0.51 g/m^2/year corresponds to the so-called "dangerous" loading level which is the cut off between a eutrophic and mesotrophic condition. If the loading were reduced to 0.40 g/m^2/year according to Vollenweider, Lake Champlain would be well within the mesotrophic zone of the loading relationship.

Loading relationships for South Lake Champlain for various conditions of effluent phosphorus reductions are presented in Table 22. South Lake Champlain phosphorus loading rates are about three times higher than for all of Lake Champlain. Prior to the New York ban on phosphate laundry detergents, the loading rate was 1.57 g/m^2/year which would be expected to decrease to 1.43 g/m^2/year following the New York ban. If Vermont imposed a similar ban and the International Paper Company reduced its phosphorus discharge by 50% the phosphorus loading rate would be 1.28 g/m^2/year. An 80% reduction by all point source discharges to South Lake Champlain or its tributaries would reduce the loading to 1.10 g/m^2/year while a 90% effluent phosphorus reduction would result in a loading of 1.04 g/m^2/year.

According to the Vollenweider relationship, the "dangerous" phosphorus loading level for South Lake Champlain is 0.85 g/m^2/year. This level could not be met even if all effluent phosphorus were removed from the South Lake Champlain drainage basin.

TABLE 21

EFFECT OF EFFLUENT PHOSPHORUS REDUCTION ON LOADING RATE TO LAKE CHAMPLAIN

Effluent Phosphorus Reduction	Annual Total Phosphorus* Load from Point Waste Sources (lbs)	Annual Total Phosphorus* Load Including all Sources (lbs)	Annual Total Phosphorus* Load from Point Waste Sources (g/m^2)
Condition prior to NY Phosphate Detergent Ban (0%)	393,460	1,318,650	0.53
Condition after NY Phosphate Detergent Ban (50% NY, 0% VT)	335,320	1,260,510	0.51
50% (equivalent to P Detergent ban in NY and VT, 50% removal from IPCo.)	196,720	1,121,920	0.45
80% (both states)	78,690	1,003,890	0.40
90% (both states)	39,347	964,550	0.39

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* Assumption in all cases that 50% of point source phosphorus discharged to tributaries actually reaches Lake Champlain.

TABLE 22

EFFECT OF EFFLUENT PHOSPHORUS REDUCTION ON LOADING RATE TO SOUTH LAKE CHAMPLAIN

Effluent Phosphorus Reduction	Annual Total Phosphorus Load from Point Sources	Annual Total Phosphorus Load from All Sources	Annual Total Phosphorus Loading Rate from All Sources
Condition prior to NY phosphate detergent ban (0%)	73,540	197,350	1.57
Condition after NY phosphate detergent ban (50% NY, 0% VT)	55,890	179,700	1.43
50% (equivalent to phosphate detergent ban in NY and VT plus 50% reduction by IPCo.)	36,670	160,680	1.28
80% (both states)	14,710	138,520	1.10
90% (both states)	7,350	131,160	1.04

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APPENDIX A

LAKE CHAMPLAIN TRIBUTARY DATA COLLECTED BY THE NATIONAL EUTROPHICATION SURVEY

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STORET RETRIEVAL DATE 74/12/27
                                                                      500171          LS500171
                                                                     45 00 00.0 073 21 00.0
                                                                     RICHELIEU RIVER
                                                                     50        15/ROUSES POINT
                                                                     O/LAKE CHAMPLAIN
                                                                     US2 BRIDGE EAST OF ROUSES POINT
                                                                     11EPALES                2111204
                                                                     4                      0000 FEET  DEPTH

                         00630      00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
 FROM     OF        N-TOTAL       N        TOTAL     ORTHO
  TO     DAY  FEET   MG/L       MG/L       MG/L     MG/L P     MG/L P

72/07/15              0.064      0.450      0.033      0.010      0.029
72/08/12 13 30        0.053      0.420      0.040      0.010      0.026
72/10/15              0.195      0.400      0.132      0.005K     0.015
72/11/04 15 15        0.150      0.780      0.037      0.009      0.031
72/12/04 10 35        0.390      0.370      0.032      0.015      0.027
73/01/06 07 45        0.252      0.310      0.011      0.011      0.020
73/02/03 11 50        0.370                 0.096      0.008      0.020
73/03/03              0.273      1.800      0.063      0.011      0.027
73/04/07 15 15        0.920      2.600      0.380      0.399      0.660
73/04/15 10 00        0.132      1.470      0.087      0.008      0.035
73/05/04 16 00        0.092      1.380      0.290      0.009      0.045
73/05/12 11 15        0.040      0.950      0.030      0.005K     0.022
73/07/08 11 20        0.010K                           0.011      0.063


              K VALUE KNOWN TO BE
              LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27

                                                              500161              LS500161
                                                              44 55 10.0 073 07 40.0
                                                              MISSISQUOI RIVER
                                                              50       7.5/EAST ALBURG
                                                              I/LAKE CHAMPLAIN
                                                              BRDG AT SWANTON
                                                              11EPALES                  2111204
                                                              4                        0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3    TOT KJEL   NH3-N     PHOS-DIS   PHOS-TOT
 FROM     OF        N-TOTAL       N       TOTAL      ORTHO
  TO     DAY  FEET   MG/L       MG/L      MG/L      MG/L P     MG/L P

72/07/15 09 55       0.115      0.400      0.048      0.014      0.034
72/08/12 12 30       0.182      0.325      0.048      0.022      0.036
72/09/23                        1.650                 0.013      0.040
72/10/15 09 00       0.144      0.600      0.132      0.014      0.048
72/11/04 15 00       0.249      0.860      0.052      0.039      0.072
72/12/04 10 55       0.210      0.400      0.016      0.010      0.020
73/01/06 09 10       0.490      0.420      0.028      0.010      0.025
73/02/03 10 45       0.530      1.600      0.110      0.026      0.085
73/03/03             0.550      0.750      0.430      0.011      0.025
73/04/07 14 30       0.319      0.630      0.100      0.010      0.035
73/04/15 09 00       0.370      4.600      2.400      0.006      0.030
73/05/06 15 10       0.273      0.600      0.058      0.014      0.070
73/05/12 10 15       0.190      0.840      0.025      0.007      0.040
73/07/09 10 45       0.240      1.050      0.140      0.020      0.040
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STORET RETRIEVAL DATE 74/12/27
                                                                     500162          LS500162
                                                                    44 54 00.0 073 06 40.0
                                                                    MISSISQUOI RIVER
                                                                    50        7.5/HIGHGATE CEN
                                                                    I/LAKE CHAMPLAIN
                                                                    US 7 BRDG SE OF SWANTON
                                                                    11EPALES                2111204
                                                                    4                      0000 FEET  DEPTH

                             00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
  FROM     OF         N-TOTAL      N        TOTAL     ORTHO
   TO     DAY   FEET    MG/L      MG/L      MG/L     MG/L P     MG/L P

72/07/15 09 15          0.095     0.500     0.046     0.017      0.035
72/09/12 10 50          0.210     0.965     0.056     0.019      0.040
72/09/23 10 00          0.010K    0.290     0.008     0.005K     0.034
72/10/15 08 30          0.098     0.950     0.075     0.022      0.068
72/11/04 14 30          0.299     0.260     0.058     0.010      0.036
72/12/04 10 15          0.380     0.370     0.018     0.014      0.019
73/02/03 11 00          0.520     0.945     0.105     0.022      0.110
73/03/03                0.550     0.700     0.250     0.008      0.025
73/04/07 14 00          0.940     0.920     0.140     0.069      0.200
73/04/15 09 00          0.200     0.720     0.071     0.010      0.030
73/05/06 15 00          0.290     0.720     0.044     0.012      0.035
73/05/12 10 00          0.200     1.400     0.042     0.007      0.040
73/07/08 10 30          0.240     0.440     0.052     0.015      0.040


                        K VALUE KNOWN TO BE
                        LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                  500163          LS500163
                                                                  44 20 00.0 072 25 00.0
                                                                  MISSISQUOI RIVER
                                                                  50      15/ IRASBURG
                                                                  I/LAKE CHAMPLAIN
                                                                  HWY 100 BRIDGE EAST OF TROY
                                                                  11EPALES              2111204
                                                                  4                     0000 FEET  DEPTH

                               00630     00625      00610      00671      00665
   DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
   FROM     OF        N-TOTAL      N        TOTAL      ORTHO
    TO     DAY  FEET    MG/L      MG/L       MG/L      MG/L P     MG/L P

72/07/15 13 19          0.233     0.500      0.024      0.086      0.124
72/09/19 09 30          0.247     0.600      0.087      0.115      0.180
72/10/15 13 15          0.200     0.500      0.094      0.032      0.054
72/11/09 11 30          0.270     0.960      0.080      0.042      0.160
72/12/07 09 00          0.340     0.500      0.033      0.021      0.053
73/03/21 15 45          0.490     0.300      0.048      0.007      0.025
73/04/07                0.357     1.050      0.042      0.014      0.045
73/04/21 11 00          0.198     1.760      0.059      0.007      0.020
73/05/06 10 50          0.290     0.350      0.022      0.075      0.095
73/05/23 10 30          0.210     0.660      0.088      0.031      0.065
73/06/28 14 30          0.126     0.500      0.240      0.017      0.045
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STORET RETRIEVAL DATE 74/12/27
                                                            500181          LS500181
                                                            44 48 00.0 073 05 00.0
                                                            STEVENS BROOK
                                                            50       7.5/ST ALBANS
                                                            T/LAKE CHAMPLAIN
                                                            US 7 BRDG IN ST ALBANS
                                                            11EPALES               2111204
                                                            4                     0000 FEET  DEPTH

                              00630      00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N     PHOS-DIS   PHOS-TOT
 FROM     OF        N-TOTAL      N        TOTAL     ORTHO
  TO     DAY  FEET   MG/L       MG/L      MG/L     MG/L P     MG/L P

72/07/15 10 50         0.519     0.550     0.100     0.054     0.093
72/08/12 11 00         0.392     0.500     0.065     0.052     0.270
72/09/10               0.330     0.450     0.320     0.058     0.084
72/10/15               0.169     0.400     0.105     0.042     0.072
72/11/04 14 25         0.540     0.580     0.072     0.046     0.115
72/12/04 10 05         0.830     0.320     0.014               0.072
73/02/03 10 15         0.490     1.050     0.230     0.078     0.210
73/03/03               0.780     0.310     0.100     0.017     0.035
73/04/07 13 25         0.315     0.520     0.105     0.010     0.035
73/04/19 09 30         0.610     2.100     0.830     0.058     0.190
73/05/06 14 20         0.252     1.100     0.090     0.105     0.250
73/05/14               0.630     1.050     0.100     0.072     0.195
73/07/08 09 30         0.340     1.050     0.290     0.054     0.100
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STORET RETRIEVAL DATE 74/12/27
                                                                        500192           LS500182
                                                                       44 51 00.0 073 07 25.0
                                                                       STEVENS BROOK
                                                                       50        7.5/ST ALBANS
                                                                       T/LAKE CHAMPLAIN
                                                                       NEWTON RD BRIDGE
                                                                       11EPALES                2111204
                                                                       4                     0000 FEET  DEPTH

                               00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3  TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL      N        TOTAL     ORTHO
   TO     DAY  FEET   MG/L      MG/L       MG/L     MG/L P     MG/L P

72/07/15 10 30         0.073      3.750      0.960      1.200      2.200
72/08/12 11 15         0.920      1.150      0.198      0.273      0.390
72/09/23               0.450      7.000      0.170      0.280      1.100
72/10/15               0.311      4.450      1.500                 2.400
72/11/04 12 30         0.290      2.600      0.660      0.210      0.820
72/12/04 09 55         0.810      2.400      0.660      0.330      0.630
73/02/03 09 30         0.620      4.900      0.550      0.210      1.350
73/03/03               0.810      0.960      0.132      0.021      0.110
73/04/07 13 00         0.079      0.790      0.189      0.005K     0.030
73/04/19 08 30         0.390      2.940      1.160      0.910      1.150
73/05/06 14 00         0.176      3.000      0.210      0.290      0.410
73/05/14               0.370      1.900      0.360      0.320      0.470
73/07/09 10 20         0.080      7.600      3.400      0.890      1.570


                    K VALUE KNOWN TO BE
                    LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                        500141           LS500141
                                                                       44 36 30.0 073 12 15.0
                                                                       LAMOILLE RIVER
                                                                       50        7.5/FT ETHAN ALL
                                                                       1/LAKE CHAMPLAIN
                                                                       BRDG ON HWY US 2
                                                                       11EPALES                 2111204
                                                                       4                       0000 FEET  DEPTH

                               00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3  TOT KJEL   NH3-N   PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL     N       TOTAL    ORTHO
   TO     DAY  FEET    MG/L     MG/L     MG/L     MG/L P    MG/L P

72/07/15 12 30          0.147     0.270     0.044     0.011     0.022
72/08/12 13 30          0.234     0.590     0.060     0.011     0.026
72/10/04 08 30          0.132     0.350     0.079     0.009     0.019
72/10/15 10 45          0.210     0.500     0.086     0.005K    0.014
72/11/04 10 40          0.240     0.450     0.044     0.005K    0.023
72/12/02 12 30          0.350     0.610     0.024     0.005K    0.037
73/01/13 13 30          0.460     0.440     0.044     0.014     0.025
73/02/10 10 30          0.430     1.260     0.096     0.011     0.155
73/03/10 11 00          0.530     0.500     0.120     0.022     0.070
73/04/07 11 35          0.320     0.660     0.200     0.009     0.030
73/04/21 08 15          0.360     0.300     0.046     0.008     0.030
73/05/12 09 50          0.240     0.270     0.012     0.005K    0.030
73/06/03 10 05          0.210     1.000     0.570     0.005K    0.025


                K VALUE KNOWN TO BE
                LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                              500121           LS500121
                                                                             44 33 30.0 073 09 30.0
                                                                             MALLETTS CREEK
                                                                             50       7.5/FT FTHAN ALL
                                                                             T/LAKE CHAMPLAIN
                                                                             US 7 AND RT 2 BRDG
                                                                             11EPALES                 2111204
                                                                             4                      0000 FEET  DEPTH

                            00630      00625     00610      00671     00665
  DATE     TIME DEPTH NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS  PHOS-TOT
  FROM      OF         N-TOTAL       N       TOTAL      ORTHO
   TO      DAY  FEET    MG/L       MG/L      MG/L      MG/L P    MG/L P

72/07/15 12 45          0.327      0.650     0.019      0.027     0.061
72/08/12 14 00          0.240      0.630     0.052      0.018     0.046
72/10/04 08 00          0.270      0.500     0.056      0.016     0.037
72/10/15 10 30          0.220      1.150     0.084      0.006     0.044
72/11/04 10 40          0.299      0.420     0.044      0.009     0.040
72/12/02 13 35          0.350      0.770     0.036      0.007     0.030
73/01/13 14 15          0.520      3.780     0.176      0.013     0.042
73/02/10 11 15          0.440      1.310     0.088      0.012
73/03/10 09 00          0.320      0.440     0.084      0.011     0.060
73/04/07 07 30          0.189      0.365     0.044      0.012     0.040
73/04/15 13 30          0.250      0.460     0.024      0.008     0.025
73/04/21 07 00          0.220      0.720     0.176      0.012     0.035
73/05/12 09 05          0.092      0.400     0.008      0.005K    0.040
73/06/03 10 00          0.100      1.000     0.450      0.009     0.035


                   K VALUE KNOWN TO BE
                   LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                  500131           LS500131
                                                                 44 29 00.0 073 12 00.0
                                                                 WINOOSKI RIVER
                                                                 50      15/BURLINGTON
                                                                 I/LAKE CHAMPLAIN
                                                                 BRDG ON US 7
                                                                 11EPALES                2111204
                                                                 4                      0000 FEET  DEPTH

                             00630     00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL      N        TOTAL      ORTHO
   TO     DAY   FEET   MG/L      MG/L       MG/L      MG/L P     MG/L P

72/08/12 08 55         0.390     0.480      0.231      0.064      0.120
72/09/10 10 30         0.390     0.650      0.220      0.056      0.115
72/10/14 09 30         0.420     0.750      0.200      0.054      0.110
72/11/05 10 30         0.280     0.440      0.150      0.040      0.096
72/12/03 13 00         0.360     0.370      0.054      0.033      0.042
73/01/06 10 30         0.420     0.340      0.052      0.018      0.035
73/02/03 10 00         0.470                0.076      0.028      0.060
73/03/03               0.550     0.690      0.340      0.025      0.050
73/04/07               0.360     0.340      0.036      0.012      0.045
73/04/21               0.340     0.350      0.056      0.014      0.040
73/05/05 10 00         0.357     0.300      0.060      0.017      0.050
73/05/13               0.250     2.100      0.930      0.011      0.050
73/07/08 11 00         0.520     0.390      0.057      0.013      0.075
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STORET RETRIEVAL DATE 74/12/27
                                                                   500132          LS500132
                                                                  44 29 00.0 073 09 30.0
                                                                  WINOOSKI RIVER
                                                                  50       15/BURLINGTON
                                                                  1/LAKE CHAMPLAIN
                                                                  BRDG OVER WINOOSKI GORGE
                                                                  11EPALES                 2111204
                                                                  4                        0000 FEET  DEPTH
                             00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL      N        TOTAL      ORTHO
   TO     DAY  FEET   MG/L       MG/L      MG/L      MG/L P     MG/L P

72/08/12 09 40          0.350      0.440      0.150      0.026      0.080
72/09/10 10 45          0.350      0.550      0.096      0.015      0.058
72/10/14 10 30          0.410      0.900      0.150      0.078      0.130
72/11/05 11 30          0.280      0.920      0.147      0.040      0.090
72/12/02 10 00          0.350      0.420      0.060      0.017      0.048
73/01/06 11 30          0.430      1.260      0.060      0.021
73/02/03 13 15          0.440      0.480      0.082      0.033      0.070
73/03/03                0.560      0.400      0.100      0.025      0.065
73/04/07 10 30          0.360      1.000      0.300      0.011      0.095
73/04/21                0.380      0.330      0.038      0.012      0.035
73/05/05 09 00          0.370      0.350      0.060      0.016      0.040
73/05/13 18 00          0.240      0.360      0.052      0.009      0.045
73/07/08 11 40          0.320      1.080      0.230      0.021      0.080
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STORET RETRIEVAL DATE 74/12/27
                                                                       500133           LS500133
                                                                      44 23 00.0 072 56 00.0
                                                                      WINOOSKI RIVER
                                                                      50        15/CAMELS HUMP
                                                                      I/LAKE CHAMPLAIN
                                                                      BRDG AT JONESVILLE
                                                                      11EPALES                    2111204
                                                                      4                          0000 FEET  DEPTH

                             00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL      N       TOTAL      ORTHO
   TO     DAY   FEET   MG/L      MG/L      MG/L      MG/L P     MG/L P

72/07/15 10 00           0.239      0.500      0.024      0.025      0.046
72/08/12 10 40           0.330      0.750      0.063      0.027      0.054
72/09/16 11 15           0.540      0.350      0.100      0.033      0.056
72/10/14 10 15           0.340      0.400      0.069      0.033      0.060
72/11/04 10 00           0.240      0.400      0.040      0.021      0.062
72/12/03 15 00           0.370      0.290      0.026      0.025      0.035
73/02/04 11 30           0.399      0.420      0.078      0.011      0.045
73/04/22 11 30           0.220      0.330      0.080      0.024      0.115
73/05/05 08 30           0.273      0.560      0.069      0.008      0.050
73/05/24 11 30           0.210      0.350      0.015      0.009      0.045
73/06/10 13 30           0.230      0.960      0.037      0.007      0.035
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STORET RETRIEVAL DATE 74/12/27
                                                                  500134          LS500134
                                                                 44 19 30.0 072 45 00.0
                                                                 WINOOSKI RIVER
                                                                 50       15/MONTPELIER
                                                                 I/LAKE CHAMPLAIN
                                                                 SMITHS BRDG SE OF WATERBURY
                                                                 11EPALES             2111204
                                                                 4                    0000 FEET  DEPTH

                           00630      00625      00610      00671      00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
  FROM    OF        N-TOTAL      N        TOTAL      ORTHO
   TO    DAY  FEET    MG/L      MG/L      MG/L      MG/L P     MG/L P

72/07/15 10 30        0.257      0.600      0.063      0.044      0.075
72/08/12 11 15        0.330      0.280      0.054      0.029      0.056
72/09/16 12 00        0.600      0.500      0.198      0.058      0.120
72/10/14 09 15        0.430      0.550      0.190      0.046      0.088
72/11/04 15 00        0.240      0.420      0.062      0.031      0.088
72/12/03 14 00        0.374      0.340      0.030      0.031      0.056
73/01/06              0.400      0.400      0.043      0.023      0.045
73/02/04 11 00        0.349      0.400      0.072      0.010      0.030
73/03/03 11 01        0.510      0.320      0.085      0.037      0.080
73/04/08 12 00        0.329      0.260      0.046      0.009      0.035
73/04/22 12 00        0.320      0.540      0.240      0.010      0.030
73/05/24 12 00        0.189      0.350      0.012      0.007      0.047
73/06/10 14 30        0.198      1.200      0.042      0.009      0.040
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STORET RETRIEVAL DATE 74/12/27
                                                                    500135          LS500135
                                                                   44 31 30.0 073 15 30.0
                                                                   WINOOSKI RIVER
                                                                   50        15/PLATTSBURG NY
                                                                   I/LAKE CHAMPLAIN
                                                                   HWOS RT 127
                                                                   11EPALES                2111204
                                                                   4                      0000 FEET  DEPTH

                            00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL      N       TOTAL     ORTHO
   TO     DAY  FEET    MG/L      MG/L      MG/L     MG/L P    MG/L P

72/07/15 10 25         0.239     0.750     0.015     0.012     0.046
72/08/12 08 35         0.390     0.310     0.075     0.028     0.058
72/09/10 10 10         0.320     0.500     0.072     0.017     0.069
72/10/14 08 30         0.470     1.300     0.240     0.044     0.105
72/11/05 09 30         0.310     1.050     0.138     0.040     0.092
72/12/02 10 30         0.340     0.440     0.044     0.018     0.050
73/01/06 09 30         0.440     0.540     0.056     0.076
73/03/03               0.540     0.310     0.091     0.027     0.055
73/04/07 09 00         0.370     0.330     0.060     0.012     0.045
73/04/21               0.340     0.270     0.050     0.014     0.035
73/05/05 11 00         0.360     0.295     0.054     0.015     0.035
73/05/13 17 00         0.240     1.540     0.420     0.008     0.045
73/06/10 08 00         0.320     1.890     0.870     0.008     0.075
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STORET RETRIEVAL DATE 74/12/27
                                                                500136          LS500136
                                                               44 25 30.0 073 01 00.0
                                                               WINOOSKI RIVER
                                                               50       15/BURLINGTON
                                                               I/LAKE CHAMPLAIN
                                                               BRDG ON HWY US 2
                                                               11EPALES                2111204
                                                               4                      0000 FEET  DEPTH

                           00630     00625     00610     00671     00665
  DATE   TIME DEPTH NO2&NO3  TOT KJEL   NH3-N   PHOS-DIS  PHOS-TOT
  FROM    OF        N-TOTAL     N       TOTAL    ORTHO
   TO    DAY  FEET   MG/L      MG/L     MG/L    MG/L P    MG/L P

72/07/15 12 20        0.287     0.750     0.037     0.017     0.040
72/08/12 10 15        0.342     0.490     0.045     0.021     0.039
72/09/10 12 25        0.450     0.275     0.072     0.017     0.038
72/10/14 11 00        0.312     1.300     0.082     0.048     0.092
72/11/05 13 50        0.280     0.520     0.084     0.027     0.063
72/12/02 13 00        0.357     0.520     0.019     0.009     0.031
73/01/06 13 00        0.420     0.350     0.037     0.016     0.035
73/04/07 11 00        0.370     0.270     0.047     0.012     0.050
73/04/22 10 05        0.360     0.370     0.052     0.009     0.045
73/05/05              0.310     0.200     0.042     0.009     0.025
73/05/13 10 30        0.230     0.420     0.058     0.006     0.035
73/06/10 10 30        0.310     0.440     0.110     0.008     0.080
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STORET RETRIEVAL DATE 74/12/27
                                                              500151          LS500151
                                                              44 23 00.0 073 13 30.0
                                                              LA PLATTE RIVER
                                                              50       15/BURLINGTON
                                                              T/LAKE CHAMPLAIN
                                                              RT 7 BRDG
                                                              11EPALES              2111204
                                                              4                     0000 FEET  DEPTH

                         00630     00625      00610     00671     00665
 DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS  PHOS-TOT
 FROM     OF        N-TOTAL      N        TOTAL     ORTHO
  TO     DAY  FEET   MG/L       MG/L      MG/L     MG/L P    MG/L P

72/07/15 14 20        0.024     1.000     0.078     0.105     0.180
72/08/12 11 31        0.032     0.540     0.039     0.061     0.095
72/09/10 11 10        0.025     0.800     0.066     0.074     0.120
72/10/14 14 00        0.030     1.000     0.075     0.034     0.078
72/11/05 15 00        0.213     0.880     0.050     0.085     0.130
72/12/01 09 35        0.300     0.700     0.006     0.042     0.083
73/01/05 13 30        0.290     1.200     0.044     0.044     0.250
73/02/03 12 45        0.470     1.350     0.273     0.170     0.250
73/04/07              0.140     0.560     0.037     0.040     0.080
73/04/22 11 30        0.016     0.610     0.014     0.071     0.120
73/05/06 09 30        0.010K    0.500     0.024     0.038     0.090
73/05/13 10 30        0.010K    0.690     0.037     0.034     0.040
73/07/08 09 30        0.066     0.400     0.037     0.067     0.110


                K VALUE KNOWN TO BE
                LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27

500181 LS500181
44 10 00.0 073 15 30.0
OTTER CREEK
50 15/PORT HENRY
I/LAKE CHAMPLAIN
ST HWY 22A BRIDGE AT VERGENNES
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/08/12	11 00		0.400	0.755	0.060	0.037	0.069
72/09/10	13 50		0.340	0.400	0.060	0.028	0.058
72/10/14	12 30		0.280	0.850	0.098	0.037	0.080
72/11/05	14 30		0.273	0.720	0.078	0.038	0.080
72/12/02	11 00		0.357	0.260	0.021		
73/01/06	12 00		0.460	0.510	0.042	0.026	0.075
73/02/03	12 15		0.440	1.400	0.189	0.066	0.190
73/03/03			0.510	0.500	0.110	0.025	0.060
73/04/07	12 30		0.234	1.050	0.140	0.021	0.065
73/04/22	08 30		0.370	0.440	0.021	0.019	0.045
73/05/06	15 00		0.378	0.560	0.110	0.025	0.055
73/05/12	10 00		0.340	2.520	1.000	0.024	0.060
73/07/08	14 00		0.160	1.680	0.189	0.044	0.105

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STORET RETRIEVAL DATE 74/12/27
                                                                                500182           LS500182
                                                                               43 48 30.0 073 09 00.0
                                                                               OTTER CREEK
                                                                               50       7.5/SUDBURY
                                                                               I/LAKE CHAMPLAIN
                                                                               ST HWY 73 BRIDGE 2.7 MILES W OF BRANDON
                                                                               11EPALES                2111204
                                                                               4                      0000 FEET  DEPTH

                          00630     00625     00610     00671     00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
  FROM    OF        N-TOTAL      N       TOTAL     ORTHO
   TO    DAY  FEET   MG/L       MG/L      MG/L     MG/L P    MG/L P

72/07/15 15 40         0.198     1.500     0.063     0.038     0.071
72/08/12 12 30         0.290     0.690     0.071     0.044     0.075
72/09/10 11 00         0.330     0.500     0.115     0.046     0.092
72/10/14 16 00         0.550     1.050     0.062     0.006     0.088
72/11/04               0.280     0.600     0.077     0.039     0.110
72/12/09 14 50         0.399     0.500     0.023     0.020     0.082
73/03/10 13 50         0.510     0.420     0.044     0.015     0.040
73/04/08               0.290     0.370     0.072     0.021
73/04/22 10 00         0.390     0.820     0.073     0.028     0.050
73/05/06 14 30         0.370     0.390     0.093     0.030     0.055
73/05/16               0.260     0.400     0.060     0.023     0.045
73/06/02 10 30         0.250     0.490     0.078     0.021     0.050
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STORET RETRIEVAL DATE 74/12/27
                                                                  500192          LS500192
                                                                 43 34 00.0 073 23 30.0
                                                                 POULTNEY RIVER
                                                                 50       15/WHITEHALL
                                                                 I/LAKE CHAMPLAIN
                                                                 BRIDGE ON EAST BAY ROAD N OF WHITEHALL
                                                                 11EPALES                2111204
                                                                 4                       0000 FEET  DEPTH

                         00630      00625      00610      00671      00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
  FROM    OF        N-TOTAL      N        TOTAL     ORTHO
   TO    DAY  FEET   MG/L       MG/L      MG/L     MG/L P     MG/L P

72/07/15 14 00        0.217      0.600      0.033      0.030      0.056
72/08/12 11 00        0.319      0.750      0.064      0.031      0.056
72/09/10 10 00        0.167      0.500      0.087      0.030      0.060
72/10/14 14 30        0.250      0.550      0.078      0.025      0.064
72/11/04              0.170      0.630      0.092      0.028      0.094
72/12/09 12 30        0.303      0.630      0.028      0.022      0.069
73/03/10 11 00        0.310      0.560      0.068      0.028      0.118
73/04/08 10 00        0.200      0.390      0.028      0.018      0.070
73/04/22 10 15        0.150      0.400      0.033      0.015      0.040
73/05/05 13 35        0.154      0.500      0.029      0.015      0.050
73/05/16              0.154      0.340      0.016      0.018      0.050
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STORET RETRIEVAL DATE 74/12/27
                                                                        500191          LS500191
                                                                        43 30 30.0 073 11 00.0
                                                                        POULTNEY RIVER
                                                                        50       7.5/POULTNEY
                                                                        I/LAKE CHAMPLAIN
                                                                        ST RT 140 BETWEEN EPOULTNEY& MIDDLETONSP
                                                                        11EPALES                 2111204
                                                                        4                        0000 FEET  DEPTH

                               00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N      PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL     N        TOTAL      ORTHO
   TO     DAY  FEET   MG/L      MG/L      MG/L       MG/L P     MG/L P

72/07/15               0.412     0.400     0.027      0.010      0.014
72/08/12 11 00         0.447     0.160     0.031                 0.011
72/09/10 09 30         0.430     0.200     0.048      0.012      0.017
72/10/14 14 00         0.250     0.400     0.075      0.008      0.015
72/11/04               0.370     0.230     0.025      0.005K     0.012
72/12/09 11 55         0.440     0.180     0.011      0.006      0.018
73/01/19 10 40         0.570     0.270     0.025      0.010      0.045
73/02/16 11 20         0.470               0.350      0.005K     0.005K
73/03/10 13 00         0.378     0.100K    0.008      0.005K     0.020
73/04/09               0.310     0.220     0.050      0.006      0.013
73/04/22 11 00         0.150     0.370     0.016      0.006      0.010
73/05/05 13 15         0.044     0.170     0.039      0.005K     0.005K
73/05/16               0.154     0.270     0.014      0.005K     0.005K
73/06/02 11 30         0.323     0.780     0.530      0.005K     0.010


                 K VALUE KNOWN TO BE
                 LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                  5001A1            LS5001A1
                                                                 43 37 00.0 073 10 05.0
                                                                 CASTLETON RIVER
                                                                 50       7.5/POULTNEY
                                                                 T/LAKE CHAMPLAIN
                                                                 US 4 BRDG E OF CASTLETON
                                                                 11EPALES                2111204
                                                                 4                     0000 FEET  DEPTH

                           00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF          N-TOTAL      N        TOTAL      ORTHO
   TO     DAY  FEET     MG/L       MG/L       MG/L      MG/L P     MG/L P

72/08/12 09 30          0.220      0.250      0.024      0.011      0.013
72/09/10 09 00          0.435      0.450      0.315      0.006      0.009
72/10/14 11 25          0.235      0.250      0.069      0.005K     0.007
72/11/04                0.169      0.360      0.026      0.005K     0.013
72/12/09 11 10          0.240      0.200      0.005K     0.005K     0.010
73/01/18 10 00          0.450      0.170      0.026      0.005K     0.010
73/02/16 11 45          0.460      0.230      0.170      0.005K     0.005K
73/03/10 11 50          0.147      0.140      0.015      0.005K     0.015
73/04/08 11 00          0.120      0.120      0.025      0.005K     0.005K
73/04/22 11 15          0.310      0.460      0.013      0.005K     0.010
73/05/05 12 45          0.310      0.160      0.028      0.005K     0.010
73/05/16                0.200      0.220      0.011      0.005K     0.015
73/06/02 09 10          0.139      0.285      0.046      0.005K     0.010


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                            500142          LS500142
                                                           43 36 30.0 073 12 30.0
                                                           CASTLETON RIVER
                                                           50      7.5/POULTNEY
                                                           T/LAKE CHAMPLAIN
                                                           HELD RT 30 BRDG S OF CASTLETON CORNER
                                                           11EPALES                  2111204
                                                           4                        0000 FEET  DEPTH

                         00630      00625      00610      00671      00665
  DATE   TIME DEPTH NO2&NO3    TOT KJEL    NH3-N    PHOS-DIS  PHOS-TOT
  FROM    OF        N-TOTAL       N        TOTAL     ORTHO
   TO    DAY  FEET   MG/L       MG/L       MG/L      MG/L P    MG/L P

72/07/15 11 10       0.322                 0.022     0.013     0.018
72/08/12 09 50       0.329      0.500      0.035     0.011     0.011
72/09/10 09 15       0.199      0.800      0.233     0.005K    0.008
72/10/14 13 00       0.320      0.150      0.056     0.011     0.015
72/11/04             0.200      0.280      0.031     0.005K    0.016
72/12/09 11 25       0.295      0.460      0.005K    0.005K    0.013
73/01/18 10 20       0.490      0.120      0.011     0.005K    0.010
73/02/14 11 00       0.510      0.100K     0.040     0.005K    0.005K
73/03/10 12 25       0.229      0.170      0.016     0.005K    0.020
73/04/08             0.220      0.630      0.078     0.006     0.019
73/04/22 10 30       0.357      0.180      0.005K    0.005K    0.007
73/05/05 13 00       0.350      0.400      0.080     0.005K    0.005K
73/05/16             0.260      0.480      0.018     0.005K    0.010
73/06/02 09 45       0.200      0.250      0.026     0.006     0.010


                    K VALUE KNOWN TO BE
                    LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                                   500143          LS500143
                                                                  43 35 30.0 073 17 00.0
                                                                  CASTLETON RIVER
                                                                  50       15/WHITEHALL
                                                                  T/LAKE CHAMPLAIN
                                                                  RT 4W BRDG W OF FAIR HAVEN
                                                                  11EPALES                 2111204
                                                                  4                     0000 FEET  DEPTH

                          00630     00625     00610     00671     00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
  FROM    OF        N-TOTAL      N       TOTAL     ORTHO
   TO    DAY  FEET   MG/L      MG/L      MG/L     MG/L P    MG/L P

72/07/15 12 20        0.143     1.880     0.049     0.026     0.069
72/08/12 12 00        0.310     0.520     0.088     0.052     0.086
72/09/10 09 20        0.353     0.900     0.220     0.026     0.176
72/10/14 15 30        0.169     0.300     0.120     0.025     0.046
72/11/04              0.130     0.390     0.046     0.015     0.050
72/12/09 12 50        0.230     0.330     0.011     0.007     0.028
73/01/18 12 00        0.490     0.520     0.120     0.048     0.075
73/02/16 12 00        0.273     0.840     0.260     0.022     0.030
73/03/11 13 15        0.210     0.290     0.069     0.010     0.050
73/04/04 11 30        0.170     0.220     0.029     0.012     0.025
73/04/22 10 45        0.340     0.395     0.041     0.006     0.050
73/05/05 14 00        0.300     1.000     0.189     0.060     0.195
73/05/16              0.132     1.320     0.072     0.012     0.050
73/06/02 10 20        0.134     1.050     0.470     0.015     0.050
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STORET RETRIEVAL DATE 74/11/26
                                                                          3609A1           LS3609A1
                                                                         43 34 00.0 073 24 30.0
                                                                         DELAWARE/CHAMPLAIN CANAL
                                                                         36       15  WHITEHALL
                                                                         I/LAKE CHAMPLAIN
                                                                         ALONG BANK OF RD OFF ST HWY22
                                                                         11EPALES                2111204
                                                                         4                       0000 FEET  DEPTH

                               00630       00625       00610       00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N      PHOS-DIS    PHOS-TOT
  FROM     OF          N-TOTAL      N         TOTAL       ORTHO
   TO     DAY   FEET     MG/L       MG/L       MG/L       MG/L P      MG/L P

 72/11/04 10 00          0.460      0.450      0.066      0.022      0.096
 72/12/07 15 15          0.690      0.780      0.042      0.030      0.160
 73/01/04 14 02          0.800      0.460      0.042      0.015      0.048
 73/02/13 09 30          0.830      0.375      0.066      0.018      0.040
 73/04/07 09 20          0.490      0.140      0.065      0.016      0.070
 73/04/23 09 15          0.500      0.460      0.022      0.014      0.050
 73/05/07 11 00          0.350      0.980      0.042      0.016      0.060
 73/05/24 10 30          0.450      1.200      0.058      0.020      0.080
 73/06/08 16 15          0.336      1.320      0.068      0.017      0.045
 73/07/10 11 30          0.620      0.540      0.069      0.032      0.070
 73/08/14 16 45          0.340      0.400      0.027      0.021      0.070
 73/09/11 09 30          0.270      0.660      0.132      0.052      0.080
 73/10/10 11 15          0.280      0.970      0.071      0.016      0.085
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STORET RETRIEVAL DATE 74/11/26
                                                                              3609C2          LS3609C2
                                                                             43 28 00.0 073 26 00.0
                                                                             BARGE CANAL
                                                                             36      7.5 FORT ANN
                                                                             T/LAKE CHAMPLAIN
                                                                             BRDG 1 MI N OF GREAT MEADOWINT BELO STP
                                                                             11EPALES                2111204
                                                                             4                      0000 FEET  DEPTH

                         00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL     NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL       N         TOTAL      ORTHO
   TO     DAY  FEET   MG/L        MG/L       MG/L       MG/L P     MG/L P

72/11/04 09 00         0.400      0.750      0.115      0.026      0.147
72/12/07 16 05         0.630      0.440      0.040      0.021      0.072
73/01/04 14 30         0.630      1.000      0.058      0.024      0.069
73/03/08 11 45         0.570      1.130      0.250      0.081      0.220
73/04/07 09 55         0.420      0.710      0.076      0.020      0.075
73/04/23 09 00         0.310      0.540      0.029      0.015      0.080
73/05/07 11 35         0.300      0.700      0.015      0.016      0.080
73/05/24 11 30         0.360      2.640      0.063      0.023      0.085
73/06/08 14 45         0.252      0.940      0.042      0.015      0.065
73/07/10 16 45         0.480      0.720      0.017      0.018      0.110
73/08/18 18 30         0.273      0.840      0.060      0.016      0.075
73/09/11 10 25         0.280      0.900      0.052      0.017      0.075
73/10/10 11 45         0.273      0.520      0.056      0.011      0.070
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STORET RETRIEVAL DATE 74/11/26
                                                                        3609C1          LS3609C1
                                                                       43 27 00.0 073 27 00.0
                                                                       BARGE CANAL
                                                                       36       7.5 FORT ANN
                                                                       T/LAKE CHAMPLAIN
                                                                       US 4 BRDG ABOV GRT MEADOWS INST STP
                                                                       11EPALES             2111204
                                                                       4                    0000 FEET  DEPTH

                            00630     00625     00610     00671     00665
  DATE   TIME DEPTH NO2&NO3  TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
  FROM    OF       N-TOTAL      N       TOTAL     ORTHO
   TO    DAY  FEET   MG/L      MG/L      MG/L     MG/L P    MG/L P

72/11/04 08 45       0.156     0.540     0.097     0.009     0.060
72/12/07 15 55       0.056     0.200     0.012     0.005K    0.015
73/01/04 14 40       0.160     0.175     0.036     0.006     0.019
73/03/09 12 00       0.176     0.420     0.024     0.010     0.055
73/04/07 10 15       0.034     0.270     0.036     0.006     0.025
73/04/23 08 45       0.198     0.560     0.027     0.007     0.050
73/05/07 10 15       0.320     0.820     0.028     0.013     0.067
73/05/24 11 15       0.294     0.900     0.032     0.019     0.070
73/06/04 14 30       0.231     0.500     0.011     0.011     0.050
73/07/10 16 30       0.580     0.720     0.029     0.019     0.095
73/08/19 18 15       0.270     0.380     0.071     0.013     0.060
73/09/11 10 05       0.340     0.360     0.024     0.031     0.040
73/10/10 12 05       0.273     0.420     0.280     0.008     0.060


          K VALUE KNOWN TO BE
          LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                     360981          LS360981
                                                                    43 34 30.0 073 26 00.0
                                                                    SOUTH BAY
                                                                    36       15 WHITEHALL
                                                                    I/LAKE CHAMPLAIN
                                                                    ST HWY 22 BRDG BELO WHITEHALL
                                                                    11EPALES                 2111204
                                                                    4                        0000 FEET  DEPTH

                              00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL      N        TOTAL     ORTHO
   TO     DAY  FEET   MG/L       MG/L       MG/L     MG/L P     MG/L P

72/11/04 09 30         0.169      0.350      0.063     0.005K     0.048
72/12/07 15 25         0.330      0.530      0.080     0.015      0.052
73/01/04 13 30         0.126      0.215      0.027     0.006      0.012
73/03/08 11 30         0.210      0.200      0.026     0.010      0.020
73/04/07 09 00         0.115      0.300      0.038     0.010      0.035
73/04/23 09 30         0.147      0.310      0.010     0.011      0.045
73/05/07 10 30         0.126      0.630      0.033     0.013      0.050
73/05/24 10 45         0.220      1.470      0.052     0.017      0.055
73/06/08 15 55         0.138      0.540      0.025     0.016      0.035
73/07/10 11 50         0.160      0.480      0.040     0.013      0.040
73/08/18 16 20         0.018      0.290      0.011     0.008      0.045
73/09/11 09 15         0.020      0.500      0.028     0.013      0.055
73/10/10 11 25         0.092      0.420      0.044     0.008      0.045

              K  VALUE KNOWN TO BE LESS
                 THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                       3609F2           LS3609F2
                                                                      43 51 00.0 073 25 00.0
                                                                      TICONDEROGA CREEK
                                                                      36       15 TICONDEROGA
                                                                      T/LAKE CHAMPLAIN
                                                                      ST HWY 347 BRDG BELO TICONDEROGA STP
                                                                      11EPALES                 2111204
                                                                      4                        0000 FEET  DEPTH

                              00630      00625      00610      00671      00665
   DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
   FROM     OF        N-TOTAL      N        TOTAL     ORTHO
    TO     DAY  FEET    MG/L      MG/L      MG/L     MG/L P     MG/L P

72/11/04 14 15          0.036     0.350     0.072     0.018      0.066
72/12/03                0.034     0.180     0.035     0.008      0.016
73/01/06                0.042     0.200     0.009     0.007      0.020
73/01/28                0.520     0.210     0.031     0.008      0.020
73/02/24                0.021     0.350     0.029     0.007      0.010
73/04/07                0.048     1.980     0.091     0.007      0.030
73/04/22                0.025     1.780     0.035     0.005K     0.010
73/05/06                0.054     0.560     0.042     0.015      0.050
73/05/27                0.054     1.380     0.039     0.010      0.017
73/06/10                0.056     2.100     0.031     0.005K     0.015
73/07/09                0.094     0.480     0.030     0.005K     0.015
73/08/02                0.075     1.050     0.410     0.048      0.070
73/08/31                0.132     1.680     0.273     0.058      0.240
73/09/29                0.048     1.000     0.490     0.052      0.080


                    K VALUE KNOWN TO BE
                    LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                        3609F1          LS3609F1
                                                                       43 51 00.0 073 25 30.0
                                                                       TICONDEROGA CREEK
                                                                       36      15 TICONDEROGA
                                                                       T/LAKE CHAMPLAIN
                                                                       BRDG ABOVE TICONDEROGA STP
                                                                       11EPALES                2111204
                                                                       4                       0000 FEET  DEPTH

                             00630     00625     00610     00671     00665
 DATE     TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
 FROM      OF        N-TOTAL      N       TOTAL     ORTHO
  TO      DAY  FEET   MG/L       MG/L      MG/L     MG/L P    MG/L P

72/11/04 15 00         0.032     0.200     0.039     0.005K    0.017
72/12/03               0.037     0.160     0.010     0.005K    0.014
73/01/06               0.044     0.180     0.005K    0.005K    0.008
73/01/28               1.220     0.120     0.098               0.010
73/02/24               0.021     0.200     0.028     0.006     0.007
73/04/07               0.046     0.660     0.034     0.007     0.030
73/04/22               0.027     1.000     0.036     0.005K    0.005K
73/05/06               0.046     0.960     0.042     0.006     0.035
73/05/27               0.040     0.230     0.024     0.010     0.015
73/06/10               0.056     0.690     0.019     0.005K    0.015
73/07/09               0.010K    0.365     0.058     0.006     0.020
73/08/02               0.050     0.720     0.036     0.012     0.015
73/08/31               0.039     1.260     0.083     0.014     0.026
73/09/29               0.028     0.980     0.110     0.018     0.035


              K VALUE KNOWN TO BE
              LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                    360901          LS360901
                                                                   43 54 00.0 073 24 30.0
                                                                   FIVEMILE CREEK
                                                                   36       15 TICONDEROGA
                                                                   T/LAKE CHAMPLAIN
                                                                   BRDG .5 MI N OF TICONDEROGA AIRPORT
                                                                   11EPALES                 2111204
                                                                   4                       0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
  DATE   TIME DEPTH NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM    OF        N-TOTAL       N        TOTAL      ORTHO
   TO    DAY  FEET    MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/04 14 35         0.390      0.750      0.092      0.039      0.115
72/12/02               0.247      0.260      0.008      0.018      0.044
73/01/06               0.340      1.380      0.081      0.027      0.058
73/04/07               0.740      3.200      0.069      0.062      0.210
73/04/22               0.126      0.330      0.015      0.008      0.020
73/05/06               0.140      1.680      0.044      0.013      0.055
73/05/27               0.060      0.210      0.009      0.005K     0.015
73/06/10               0.060      0.560      0.010      0.006      0.015
73/07/09               0.100      0.460      0.072      0.006      0.015
73/08/02               0.198      1.260      0.012      0.022      0.035
73/08/31               0.600      1.890      0.180      0.078      0.315
73/09/29               0.180      1.800      0.510      0.017      0.050


          K VALUE KNOWN TO BE
          LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                 3609E1          LS3609E1
                                                                43 57 30.0 073 26 00.0
                                                                PUTNAM CREEK
                                                                36      15 TICONDEROGA
                                                                T/LAKE CHAMPLAIN
                                                                ST HWY 9N BRDG
                                                                11EPALES                2111204
                                                                4                      0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL       N        TOTAL      ORTHO
   TO     DAY   FEET   MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/04                 0.064      0.250      0.050      0.005K     0.009
72/12/03                 0.088      0.130      0.012      0.006      0.011
73/04/07                 0.054      1.505      0.120      0.007      0.030
73/04/22                 0.065      0.420      0.025      0.005K     0.010
73/05/06                 0.060      2.300      0.054      0.005K     0.025
73/06/10                 0.063      1.500      0.029      0.005K     0.015
73/07/09                 0.200      0.420      0.058      0.018      0.050
73/08/02                 0.168      1.570      0.640      0.005K     0.010
73/08/31                 0.350      1.200      0.300      0.014      0.090
73/09/29                 0.132      2.730      0.400      0.010      0.035


                    K VALUE KNOWN TO BE
                    LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/25
                                                                          360961          LS360961
                                                                         44 02 00.0 073 28 00.0
                                                                         MCKENZIE BROOK
                                                                         36      15 PORT HENRY
                                                                         T/LAKE CHAMPLAIN
                                                                         WATERFALL AT ST HWY 9N BRDG
                                                                         11EPALES                  2111204
                                                                         4                        0000 FEET  DEPTH

                            00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N    PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL       N        TOTAL     ORTHO
   TO     DAY  FEET   MG/L       MG/L       MG/L     MG/L P    MG/L P

72/11/04 15 18          0.062     0.360     0.027     0.005K    0.011
72/12/03                0.320     0.310     0.015     0.016     0.016
73/01/06                0.280     0.270     0.005K    0.006     0.010
73/01/28                0.605     0.250     0.052     0.012     0.012
73/04/07                0.115     0.920     0.066     0.007     0.045
73/04/22                0.115     0.890     0.048     0.005K    0.010
73/05/06                0.075     0.580     0.026     0.005K    0.025
73/05/26                0.044     1.500     0.033     0.006     0.020
73/06/10                0.058               0.028     0.005K    0.045
73/07/09                0.099     0.420     0.042     0.005K    0.015
73/08/02                0.280     0.960     0.490     0.020     0.020
73/08/31                0.294     1.260     0.088     0.020     0.150
73/09/29                0.180     1.500     0.076     0.014     0.090


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26

                                                                   3609H1          LS3609H1
                                                                  44 03 00.0 073 27 30.0
                                                                  MILL BROOK
                                                                  36      15 PORT HENRY
                                                                  T/LAKE CHAMPLAIN
                                                                  FROM BANK NEAR PT HENRY BELO MORIAH STP
                                                                  11EPALES                2111204
                                                                  4                       0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF        N-TOTAL       N        TOTAL      ORTHO
   TO     DAY  FEET    MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/04 15 30          0.370      0.850      0.054      0.069      0.105
72/12/03                0.310      0.400      0.062      0.037      0.072
73/01/06                0.336      0.340      0.046      0.038      0.073
73/01/28                0.800      0.350      0.105      0.027      0.065
73/02/24                0.023      0.580      0.025      0.006      0.010
73/04/07                0.110      0.720      0.027      0.009      0.080
73/04/22                0.160      1.320      0.048      0.019      0.070
73/05/06                0.160      0.200      0.020      0.014      0.115
73/05/27                0.050      2.520      0.058      0.007      0.020
73/06/10                0.060      1.600      0.029      0.007      0.020
73/07/09                0.200      0.630      0.046      0.016      0.050
73/08/02                0.520      1.380      0.084      0.046      0.330
73/08/31                0.580      2.100      0.170      0.044
73/09/29                0.640      0.720      0.084      0.040      0.850
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STORET RETRIEVAL DATE 74/11/26
                                                                           3609M2          LS3609M2
                                                                          44 03 00.0 073 33 00.0
                                                                          MILL BROOK
                                                                          36       15 ELIZABETHTOWN
                                                                          T/LAKE CHAMPLAIN
                                                                          BRDG 2 MI SW OF MORIAH CENTER
                                                                          11EPALES                2111204
                                                                          4                      0000 FEET  DEPTH

                            00630       00625      00610      00671      00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL     NH3-N    PHOS-DIS   PHOS-TOT
  FROM    OF          N-TOTAL       N         TOTAL      ORTHO
   TO    DAY  FEET     MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/04 16 00          0.056      0.870      0.086      0.005K     0.007
72/12/03                0.074      0.290      0.024      0.006      0.010
73/01/06                0.056      0.190      0.005K     0.005K     0.006
73/04/07                0.036      1.540      0.108      0.005K     0.030
73/04/22                0.036      0.680      0.015      0.005K     0.025
73/05/06                0.042      1.760      0.044      0.005K     0.020
73/05/27                0.048      2.600      0.058      0.006      0.020
73/06/10                0.056      1.900      0.017      0.005K     0.015
73/07/09                0.097      0.580      0.063      0.006      0.015
73/08/02                0.110      2.500      1.580      0.009      0.010
73/08/31                0.170      0.840      0.126      0.008      0.045
73/09/29                0.072      0.100K     0.042      0.005K     0.010


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                  3609L1          LS3609L1
                                                                 44 11 00.0 073 26 00.0
                                                                 HOISINGTON BROOK
                                                                 36      15 PORT HENRY
                                                                 T/LAKE CHAMPLAIN
                                                                 ST HWY 9N BRDG NEAR WESTPORT
                                                                 11EPALES                2111204
                                                                 4                       0000 FEET  DEPTH

                             00630      00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF         N-TOTAL      N       TOTAL      ORTHO
   TO     DAY   FEET    MG/L      MG/L      MG/L      MG/L P     MG/L P

72/11/06 11 00          0.420      0.885     0.105      0.039      0.110
72/12/03                0.240      0.330     0.062      0.016      0.037
73/01/06                0.340      0.310     0.008      0.013      0.034
73/04/22                0.039      0.960     0.038      0.005K     0.005K
73/05/06                0.210      0.230     0.015      0.009      0.035
73/05/27                0.046      1.300     0.034      0.005K     0.020
73/06/10                0.058      1.540     0.018      0.005K     0.020
73/07/09                0.097      0.580     0.105      0.005K     0.020
73/08/02                0.378      1.320     0.058      0.016      0.030
73/08/31                0.336      0.850     0.058      0.013      0.095
73/09/29                0.330      1.900     0.280      0.013      0.035

                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                    3609M1          LS3609M1
                                                                  44 22 00.0 073 23 00.0
                                                                  HOQUET RIVER
                                                                  36       15 WILLSHORO
                                                                  T/LAKE CHAMPLAIN
                                                                  ST HWY 22 BRDG
                                                                  11EPALES                  2111204
                                                                  4                         0000 FEET  DEPTH

                               00630      00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT
 FROM     OF         N-TOTAL      N        TOTAL     ORTHO
  TO     DAY  FEET    MG/L       MG/L      MG/L      MG/L P     MG/L P

72/11/04 15 00        0.104      0.200     0.042     0.005K     0.100
72/12/02 14 00        0.320      0.190     0.012     0.005K     0.015
73/01/06 15 00        0.176      0.200     0.012     0.005K     0.015
73/02/13 08 00        0.360      1.260     0.198     0.083      0.145
73/03/04 08 30        0.280      1.050     0.086     0.015      0.030
73/04/01 09 20        0.132      0.240     0.005K    0.005K     0.022
73/04/15              0.115      0.190     0.012     0.005K     0.025
73/05/07 09 18        0.115      0.460     0.029     0.005K     0.015
73/05/19 08 15        0.160      1.200     0.120     0.005K     0.080
73/06/10              0.024      0.500     0.008     0.005K     0.005K
73/07/14              0.110      1.600     0.034     0.005K     0.010
73/08/19 10 30        0.066      0.100K    0.019     0.008      0.025
73/09/09 10 30        0.075      0.420     0.069     0.010      0.027
73/10/13 11 15        0.031      0.220     0.029     0.005K     0.015


                    K VALUE KNOWN TO BE
                    LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                   3609N1          LS3609N1
                                                                  44 33 30.0 073 27 00.0
                                                                  AUSABLE RIVER
                                                                  36       15 PLATTSBURG
                                                                  T/LAKE CHAMPLAIN
                                                                  US HWY 9 BRDG BELO KEESEVILLE STP
                                                                  11EPALES              2111204
                                                                  4                     0000 FEET  DEPTH

                           00630       00625      00610      00671      00665
  DATE    TIME DEPTH NO2&NO3     TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF         N-TOTAL       N        TOTAL      ORTHO
   TO     DAY   FEET    MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/05                0.380      0.440      0.050      0.005K     0.021
72/12/01                0.150      0.310      0.014      0.006      0.016
72/12/30 10 00          0.320      0.360      0.034      0.016      0.016
73/02/28 13 30          1.340      1.570      0.400      0.005K     0.065
73/03/03                0.430      1.000      0.066      0.007      0.010
73/03/29 16 45          0.390      1.325      0.052      0.005K     0.015
73/04/16 12 00          0.378      0.190      0.022      0.005K     0.010
73/04/27 14 00          0.500      0.520      0.029      0.005K     0.015
73/05/15 11 45          0.470      1.980      0.835      0.005K     0.015
73/05/30 06 45          0.130      0.690      0.027      0.005K     0.010
73/07/01 15 00          0.176      1.100      0.231      0.010      0.075
73/07/29 15 00          0.115      0.500      0.110      0.008      0.015
73/08/30 16 00          0.065      0.230      0.100      0.008      0.020
73/10/04 18 40          0.154      0.500      0.096      0.011      0.025


               K VALUE KNOWN TO BE
               LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                                 3609N2          LS3609N2
                                                                                44 30 30.0 073 29 00.0
                                                                                AUSABLE RIVER
                                                                                36       15 PLATTSBURG
                                                                                T/LAKE CHAMPLAIN
                                                                                ST HWY 22 BRDG ABOVE KEESEVILLE STP
                                                                                11EPALES                 2111204
                                                                                4                      0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3    TOT KJEL     NH3-N    PHOS-DIS   PHOS-TOT
 FROM     OF        N-TOTAL       N        TOTAL      ORTHO
  TO     DAY  FEET    MG/L       MG/L       MG/L      MG/L P     MG/L P

72/11/05               0.382      0.270      0.038      0.005      0.016
72/12/02 11 30         0.350      0.370      0.021      0.006      0.016
73/01/06               0.420      0.260      0.005K     0.005K     0.010
73/02/03               0.850      0.630      0.110      0.031      0.085
73/04/07               0.310      0.460      0.018      0.005K     0.020
73/04/17 13 00         0.450      0.190      0.027      0.005K     0.010
73/05/05 16 00         0.310      1.500      0.032      0.005K     0.015
73/05/19               0.300      1.890      0.048      0.005K     0.030
73/06/01               0.110      0.330      0.024      0.005K     0.010
73/06/30               0.154      0.480      0.138      0.006      0.020
73/08/05               0.027      0.460      0.088      0.005K     0.015
73/09/08               0.126      0.630      0.078      0.005K     0.015
73/10/04               0.380                 0.126      0.013      0.080


               K VALUE KNOWN TO BE
               LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                            3609P1          LS3609P1
                                                                           44 34 30.0 073 27 00.0
                                                                           LITTLE AUSABLE RIVER
                                                                           36      15 PLATTSBURG
                                                                           T/LAKE CHAMPLAIN
                                                                           US HWY 9 BRDG BELO PERU STP
                                                                           11EPALES                 2111204
                                                                           4                        0000 FEET  DEPTH

                             00630       00625       00610       00671       00665
 DATE    TIME DEPTH NO2&NO3    TOT KJFL     NH3-N     PHOS-DIS    PHOS-TOT
 FROM     OF        N-TOTAL       N         TOTAL      ORTHO
  TO     DAY  FEET   MG/L       MG/L        MG/L      MG/L P      MG/L P

72/11/05 12 15        0.190       0.380       0.090       0.052       0.081
72/12/01              0.200       0.460       0.028       0.022       0.048
72/12/30 10 30        0.300       0.610       0.105       0.009       0.028
73/02/28 13 00        0.350       0.630       0.210       0.065       0.095
73/03/29 16 30        0.130       0.540       0.044       0.018       0.030
73/04/16 14 30        0.160       0.700       0.054       0.016       0.030
73/04/27 14 30        0.110       2.000       0.490       0.034       0.055
73/05/15 11 20        0.120       1.150       0.399       0.032       0.050
73/05/30 06 30        0.068       1.260       0.069       0.020       0.045
73/07/01 14 30        0.210       1.050       0.088       0.034       0.130
73/07/29 14 30        0.280       0.920       0.210       0.035       0.075
73/08/30 15 30        0.300       0.690       0.220       0.050       0.105
73/10/04 18 30        0.340       1.625       0.231       0.019       0.080
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STORET RETRIEVAL DATE 74/11/26
                                                                      3609P2          LS3609P2
                                                                     44 34 30.0 073 31 30.0
                                                                     LITTLE AUSAHLE RIVER
                                                                     36      15 DANNEMORA
                                                                     T/LAKE CHAMPLAIN
                                                                     DAM BELO ST HWY 22 BRDG ABOV PERU STP
                                                                     11EPALES                2111204
                                                                     4                       0000 FEET  DEPTH

                             00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL    NH3-N   PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL      N        TOTAL     ORTHO
   TO     DAY  FEET   MG/L       MG/L      MG/L     MG/L P    MG/L P

72/11/05 11 25        0.089      0.270     0.040     0.008     0.018
72/12/02 11 00        0.126      0.340     0.013     0.005K    0.014
73/01/06              0.126      0.340     0.005K    0.005K    0.012
73/02/03              1.040      1.050     0.072     0.028     0.140
73/03/03              0.231      0.290     0.060     0.008     0.015
73/04/07              0.014      0.380     0.008     0.005K    0.020
73/04/17 12 30        0.019      1.890     0.064     0.005K    0.025
73/05/05 15 00        0.042      1.050     0.020     0.006     0.025
73/05/19              0.105      2.300     0.052     0.015     0.060
73/06/01              0.019      0.500     0.018     0.011     0.050
73/06/30              0.910      1.600     0.176     0.038     0.185
73/08/05              0.021      0.500     0.058     0.014     0.035
73/09/08              0.115      0.720     0.050     0.011     0.030
73/10/04              0.176      0.350     0.015     0.008     0.015


                K VALUE KNOWN TO BE
                LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                            360901          LS360901
                                                            44 37 30.0 073 27 00.0
                                                            SALMON RIVER
                                                            36       15 PLATTSBURG
                                                            T/LAKE CHAMPLAIN
                                                            US HWY 9 BRDG 2 M E OF SOUTH PLATTSBURG
                                                            11EPALES               2111204
                                                            4                      0000 FEET  DEPTH

                          00630     00625      00610      00671      00665
 DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS   PHOS-TOT
 FROM     OF        N-TOTAL      N       TOTAL     ORTHO
  TO     DAY   FEET   MG/L      MG/L      MG/L     MG/L P     MG/L P

72/11/05 12 30        0.230     0.270     0.036     0.005K     0.013
72/12/01              0.282     0.380     0.011     0.005K     0.015
72/12/30 11 00        0.198     0.680     0.052     0.013      0.023
73/02/28 12 30        0.390     0.100K    0.050     0.006      0.015
73/03/29 16 15        0.189     0.640     0.029     0.005K     0.015
73/04/16 15 00        0.210     1.000     0.038     0.005K     0.015
73/04/28 13 30        0.150     1.380     0.071     0.006      0.015
73/05/15 11 05        0.160     1.050     0.315     0.006      0.020
73/05/30 06 15        0.084     0.920     0.108     0.005K     0.025
73/07/01 14 00        0.199     1.350     0.044     0.019      0.220
73/07/29 14 00        0.180     1.100     0.300     0.011      0.035
73/08/30 15 00        0.240     0.520     0.176     0.010      0.025
73/10/04 18 15        0.340     1.300     0.060     0.024      0.075


              K VALUE KNOWN TO BE
              LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                   3609R1          LS3609R1
                                                                  44 42 00.0 073 27 00.0
                                                                  SARANAC RIVER
                                                                  36       15 PLATTSBURG
                                                                  T/LAKE CHAMPLAIN
                                                                  US HWY 9 BRDG BELO PLATTSBURG STP
                                                                  11EPALES                 2111204
                                                                  4                        0000 FEET  DEPTH

                          00630      00625      00610      00671      00665
  DATE    TIME DEPTH  NO2&NO3    TOT KJEL     NH3-N     PHOS-DIS   PHOS-TOT
  FROM     OF         N-TOTAL       N         TOTAL      ORTHO
   TO     DAY  FEET    MG/L        MG/L        MG/L      MG/L P     MG/L P

72/11/05 12 45           0.110      0.350      0.048      0.008      0.027
72/12/01                 0.231      0.560      0.046      0.011      0.034
72/12/30 11 30           0.270      0.520      0.033      0.008      0.025
73/02/28 12 00           0.320      0.260      0.044      0.012      0.025
73/03/29 16 00           0.294      0.780      0.044      0.007      0.030
73/04/16 13 00           0.280      0.630      0.033      0.007      0.020
73/05/01 10 50           0.130      1.750      0.390      0.005K     0.025
73/05/15 11 00           0.138      1.290      0.078      0.007      0.020
73/05/30 06 00           0.090      0.370      0.040      0.005K     0.025
73/07/01 13 30           0.154      1.150      0.034      0.017      0.165
73/07/29 13 30           0.110      0.460      0.036      0.014      0.030
73/08/30 14 30           0.147      1.260      0.390      0.022      0.060
73/10/05 18 00           0.088      0.920      0.210      0.017      0.045


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                 360982        LS360982
                                                                44 39 30.0 073 44 00.0
                                                                SARANAC RIVER
                                                                36      15 DANEMORA
                                                                T/LAKE CHAMPLAIN
                                                                BRDG ON RD CONN ST HWY365-HARDSCRABLE RD
                                                                11EPALES                 2111204
                                                                4                       0000 FEET  DEPTH

                         00630     00625     00610      00671     00665
  DATE   TIME DEPTH NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS  PHOS-TOT
  FROM    OF        N-TOTAL      N        TOTAL      ORTHO
   TO    DAY  FEET    MG/L      MG/L       MG/L     MG/L P     MG/L P

72/11/05 10 30        0.093     0.340     0.044     0.005K     0.018
72/12/02 09 00        0.210     0.330     0.031     0.005K     0.016
73/01/06              0.240     0.320     0.038     0.006      0.016
73/02/03              1.400     0.285     0.076     0.005K     0.015
73/03/03              0.290     0.360     0.044     0.008      0.030
73/04/07              0.154     0.360     0.006     0.005K     0.020
73/04/17 09 00        0.120     0.400     0.026     0.005K     0.015
73/05/05 10 30        0.094               0.105     0.005K     0.025
73/05/19              0.069     0.480     0.031     0.005K     0.025
73/06/01              0.061     0.410     0.033     0.005K     0.020
73/06/30              0.120     0.560     0.160     0.014      0.030
73/08/05              0.054     0.760     0.115     0.005K     0.020
73/09/08              0.091     0.850     0.140     0.005K     0.020
73/10/05              0.350               2.200     0.014      0.065


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                                        3609R3          LS3609R3
                                                                       44 33 30.0 073 41 30.0
                                                                       SARANAC RIVER
                                                                       36       15 DANEMORA
                                                                       T/LAKE CHAMPLAIN
                                                                       ST HWY 22B BRDG ABOVE PLATTSBURG STP
                                                                       11EPALES                2111204
                                                                       4                       0000 FEET  DEPTH

                           00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL      N       TOTAL     ORTHO
   TO     DAY   FEET   MG/L      MG/L      MG/L     MG/L P    MG/L P

72/11/05 11 00         0.110     0.320     0.110     0.006     0.021
72/12/02 10 30         0.230     0.380     0.029     0.007     0.018
73/01/06               0.252     0.390     0.042     0.007     0.018
73/02/03               1.020     0.400     0.029     0.012     0.030
73/03/03               0.310     0.340     0.054     0.008     0.020
73/04/07               0.168     0.730     0.017     0.005K    0.025
73/04/17 11 30         0.126     0.400     0.072     0.005K    0.020
73/05/05 12 00         0.115     2.520     0.075     0.005K    0.025
73/05/19               0.110     2.200     0.084     0.013     0.045
73/06/01               0.084     0.360     0.023     0.008     0.035
73/06/30               0.150     0.580     0.132     0.013     0.040
73/08/05               0.063     0.720     0.132     0.022     0.045
73/09/08               0.120     0.660     0.066     0.010     0.030
73/10/05               0.350               0.180     0.044     0.085


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/11/26
                                                               360951          LS360951
                                                              44 40 00.0 073 43 00.0
                                                              BEHAN BRANCH
                                                              36      15 DANEMORA
                                                              T/LAKE CHAMPLAIN
                                                              ST HWY 365 BRDG 1 MI NE OF PICKET CORNER
                                                              11EPALES             2111204
                                                              4                    0000 FEET  DEPTH

                               00630     00625     00610     00671     00665
  DATE    TIME DEPTH NO2&NO3  TOT KJEL   NH3-N   PHOS-DIS  PHOS-TOT
  FROM     OF        N-TOTAL     N       TOTAL    ORTHO
   TO     DAY  FEET   MG/L     MG/L      MG/L     MG/L P    MG/L P

72/11/05 10 45        0.590     0.420     0.071     0.120     0.147
72/12/02 09 30        0.690     1.540     0.075     0.088     0.290
73/01/06              0.540     0.750     0.072     0.064     0.115
73/02/03 09 45        0.300     0.400     0.038     0.008     0.080
73/03/03              0.750     1.050     0.115     0.100     0.400
73/04/07              0.350     1.050     0.042     0.019     0.045
73/04/17 10 00        0.357     2.000     0.080     0.039     0.070
73/05/05 10 00        0.290     0.880     0.058     0.044     0.065
73/05/19              0.180     0.460     0.019     0.028     0.065
73/06/01              0.200     2.200     0.017     0.032     0.370
73/06/30              0.140     1.000     0.130     0.027     0.155
73/08/05              0.590     0.720     0.176     0.079     0.100
73/09/08              0.790     0.420     0.058     0.100     0.100
73/10/05              0.063     1.100     0.088     0.046     0.070
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STORET RETRIEVAL DATE 74/11/26
                                                                    3609T1          LS3609T1
                                                                   44 53 30.0 073 25 00.0
                                                                   LITTLE CHAZY RIVER
                                                                   36      15 ROUSES POINT
                                                                   T/LAKE CHAMPLAIN
                                                                   HRDG ON RD N FROM NORTH FARM RD
                                                                   11EPALES                2111204
                                                                   4                 0000 FEET  DEPTH

                             00630       00625       00610       00671       00665
  DATE    TIME DEPTH NO2&NO3    TOT KJEL    NH3-N      PHOS-DIS    PHOS-TOT
  FROM     OF        N-TOTAL       N        TOTAL       ORTHO
   TO     DAY  FEET    MG/L       MG/L       MG/L       MG/L P      MG/L P

72/11/05 14 00           0.546       1.300       0.113       0.091       0.147
72/12/02 10 00           0.558       0.540       0.006       0.011       0.029
72/12/30 10 30           0.360       0.500       0.040       0.010       0.020
73/02/28 11 50           0.470       0.210       0.048       0.015       0.025
73/03/29 15 30           0.360       1.300       0.058       0.017       0.035
73/04/16 14 00           0.370       0.390       0.054       0.019       0.030
73/05/01 10 30           0.231       1.400       0.220       0.019       0.040
73/05/15 10 30           0.240       1.050       0.200       0.026       0.035
73/05/30 05 30           0.190       1.150       0.052       0.020       0.055
73/07/01 13 30           0.800       1.600       0.160       0.074       0.230
73/07/29 13 00           0.270       1.380       0.360       0.036       0.065
73/08/30 14 00           0.100       0.660       0.315       0.037       0.050
73/10/04 17 30           0.115       1.200       0.300       0.033       0.085
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STORET RETRIEVAL DATE 74/11/26
                                                                  3609U1          LS3609U1
                                                                 44 56 00.0 073 24 30.0
                                                                 GREAT CHAZY RIVER
                                                                 36       15 ROUSES POINT
                                                                 T/LAKE CHAMPLAIN
                                                                 ST HWY 98 BRDG BELO CHAMPLAIN STP
                                                                 11EPALES                2111204
                                                                 4                      0000 FEET  DEPTH

                             00630       00625       00610       00671       00665
  DATE    TIME DEPTH NO2&NO3   TOT KJEL     NH3-N     PHOS-DIS    PHOS-TOT
  FROM     OF        N-TOTAL       N        TOTAL      ORTHO
   TO     DAY  FEET    MG/L       MG/L       MG/L      MG/L P      MG/L P

72/11/05 14 30          0.320       0.560      0.069      0.040      0.086
72/12/02 10 15          0.350       0.540      0.035      0.014      0.037
72/12/30 11 00          0.378       0.460      0.054      0.022      0.032
73/02/28 11 30          0.470       0.440      0.072      0.014      0.025
73/03/29 15 10          0.260       0.660      0.043      0.011      0.025
73/04/16 13 30          0.260       0.915      0.064      0.012      0.025
73/04/27 15 00          0.126       2.400      0.270      0.015      0.030
73/05/15 10 15          0.126       1.260      0.210      0.019      0.030
73/05/30 05 15          0.077       0.860      0.210      0.009      0.030
73/07/01 12 30          0.085       0.660      0.082      0.032      0.095
73/07/29 12 30          0.310       0.650      0.079      0.035      0.065
73/08/30 13 30          0.176       0.725      0.390      0.060      0.100
73/10/04 17 15          0.154       1.700      0.180      0.032      0.060
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STORET RETRIEVAL DATE 74/11/26
                                                                   3609U2           LS3609U2
                                                                  44 58 30.0 073 27 30.0
                                                                  GREAT CHAZY RIVER
                                                                  36       15 ROUSES POINT
                                                                  T/LAKE CHAMPLAIN
                                                                  BRDG .5 MI W OF CHAMPLAIN ABOV STP
                                                                  11EPALES               2111204
                                                                  4                     0000 FEET  DEPTH

                               00630       00625       00610       00671       00665
  DATE     TIME DEPTH  NO2&NO3    TOT KJEL     NH3-N     PHOS-DIS    PHOS-TOT
  FROM      OF         N-TOTAL       N         TOTAL      ORTHO
   TO      DAY   FEET    MG/L       MG/L        MG/L      MG/L P      MG/L P

72/11/05 15 00          0.280       0.460       0.052       0.015       0.040
72/12/02 10 30          0.340       0.350       0.016       0.006       0.019
72/12/30 11 00          0.370       1.760       0.320       0.006       0.010
73/02/28 11 00          0.430       0.310       0.038       0.007       0.015
73/03/29 15 00          0.210       0.310       0.029       0.006       0.020
73/04/16 12 30          0.210       0.380       0.028       0.007       0.020
73/04/27 15 30          0.130                   0.147       0.006       0.020
73/05/15 09 00          0.120       1.050       0.160       0.008       0.020
73/05/30 05 00          0.068       1.320       0.260       0.006       0.025
73/07/01 12 00          0.115       1.600       0.420       0.016       0.045
73/07/29 12 00          0.105       0.880       0.180       0.014       0.030
73/08/30 13 00          0.105       0.520       0.252       0.022       0.035
73/10/04 17 00          0.230       1.050       0.261       0.020       0.080
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APPENDIX B

FLOW DATA FOR
LAKE CHAMPLAIN TRIBUTARIES

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3609 LAKE CHAMPLAIN

TOTAL DRAINAGE AREA OF LAKE 8277.00

	SUB-DRAINAGE						NORMALIZED FLOWS							
TRIBUTARY	AREA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
3609A1	692.00	714.00	783.00	1210.00	2230.00	1470.00	929.00	621.00	498.00	519.00	625.00	730.00	730.00	920.75
3609B1	43.60	45.00	49.30	76.50	140.00	92.90	58.50	39.20	31.40	32.70	39.40	46.00	46.00	58.02
3609F1	262.00	259.00	324.00	374.00	606.00	488.00	327.00	180.00	149.00	136.00	161.00	176.00	202.00	281.16
3609G1	10.30	10.60	11.70	18.10	33.10	22.00	13.80	9.25	7.41	7.72	9.30	10.90	10.90	13.72
3609H1	27.10	27.90	30.70	47.50	87.20	57.80	36.40	24.30	19.50	20.30	24.50	28.60	28.60	36.08
3609L1	11.40	11.80	12.90	20.00	36.70	24.30	15.30	10.20	8.20	8.55	10.30	12.00	12.00	15.17
3609M1	278.00	287.00	314.00	488.00	895.00	593.00	373.00	250.00	200.00	208.00	251.00	293.00	293.00	370.09
3609N1	518.00	534.00	586.00	908.00	1670.00	1100.00	695.00	465.00	373.00	388.00	468.00	546.00	546.00	689.29
3609P1	71.80	74.00	81.20	126.00	231.00	153.00	96.40	64.50	51.60	53.80	64.80	75.70	75.70	95.56
3609Q1	66.00	68.10	74.70	116.00	212.00	141.00	88.60	59.30	47.50	49.50	59.60	69.60	69.60	87.88
3609R1	614.00	633.00	695.00	1080.00	1980.00	1310.00	824.00	551.00	442.00	460.00	554.00	647.00	648.00	817.94
3609S1	9.92	10.20	11.20	17.40	31.90	21.10	13.30	8.91	7.14	7.44	8.95	10.50	10.50	13.20
3609T1	51.20	52.80	57.90	89.80	165.00	109.00	68.70	46.00	36.80	38.40	46.20	54.00	54.00	68.16
3609U1	300.00	309.00	339.00	526.00	965.00	639.00	403.00	269.00	216.00	225.00	271.00	316.00	316.00	399.15
3609ZZ	1483.00	1530.00	1680.00	2600.00	4770.00	3160.00	1990.00	1330.00	1070.00	1110.00	1340.00	1560.00	1560.00	1973.23

NOTE *** NO OUTLET GAGE IN THE U.S.

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3609A1	11	72	997.00	4	895.00				
	12	72	1060.00	7	1380.00				
	1	73	1100.00	4	1290.00				
	2	73	1030.00	13	860.00				
	3	73	2230.00	8	1950.00				
	4	73	2510.00	7	2960.00	23	2250.00		
	5	73	1800.00	7	1310.00	24	2770.00		
	6	73	1850.00	8	1480.00				
	7	73	853.00	10	804.00				
	8	73	553.00	18	590.00				
	9	73	792.00	11	610.00				
	10	73	711.00	10	778.00				

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3609 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3609B1	11	72	62.80	4	56.40				
	12	72	66.80	7	86.80				
	1	73	69.20	4	81.00				
	2	73	65.00	13	54.20				
	3	73	141.00	8	123.00				
	4	73	158.00	7	186.00	23	142.00		
	5	73	113.00	7	82.50	24	174.00		
	6	73	117.00	8	93.20				
	7	73	53.90	10	50.60				
	8	73	34.90	18	37.10				
	9	73	49.90	11	38.40				
	10	73	44.80	10	49.00				
3609F1	11	72	661.00	4	155.00				
	12	72	749.00	3	904.00				
	1	73	571.00	6	608.00	28	547.00		
	2	73	788.00	24	814.00				
	3	73	796.00						
	4	73	0.0	7	1030.00	22	917.00		
	5	73	0.0	27	1060.00				
	6	73	459.00	10	764.00				
	7	73	203.00	9	174.00				
	8	73	43.30	2	49.00	31	41.00		
	9	73	37.20						
	10	73	35.60						
3609G1	11	72	14.90	4	13.30				
	12	72	15.80	3	13.10				
	1	73	16.30	6	16.50	28	7.40		
	2	73	15.40						
	3	73	33.40	8	18.00				
	4	73	37.30	7	29.80	22	16.80		
	5	73	26.90	6	10.60	26	18.70		
	6	73	27.50	10	7.85				
	7	73	12.70	9	2.38				
	8	73	8.23	2	1.97	31	1.00		
	9	73	11.80						
	10	73	10.60						
3609H1	11	72	39.10	4	29.50				
	12	72	41.50	3	29.20				
	1	73	42.90	6	36.80	28	38.80		
	2	73	40.50	24	24.00				
	3	73	87.70						
	4	73	98.30	7	133.00	22	75.50		
	5	73	70.60	6	48.50	27	75.50		
	6	73	72.60	10	42.50				
	7	73	33.40	9	26.20				
	8	73	21.60	2	23.50	31	6.60		
	9	73	31.00						
	10	73	27.90						

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3609 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3609L1	11	72	16.40	6	14.00				
	12	72	17.40	3	13.60				
	1	73	18.10	6	17.20				
	2	73	17.00						
	3	73	36.90						
	4	73	41.40	7	40.80	22	24.60		
	5	73	29.70	6	17.60	27	24.60		
	6	73	30.50	10	15.80				
	7	73	14.00	9	8.00				
	8	73	9.10	2	7.80	31	1.66		
	9	73	13.00						
	10	73	11.70						
3609M1	11	72	400.00	4	720.00				
	12	72	425.00	2	725.00				
	1	73	441.00	6	898.00				
	2	73	414.00	13	694.00				
	3	73	901.00	4	656.00				
	4	73	1010.00	1	760.00	15	675.00		
	5	73	724.00	7	555.00	19	764.00		
	6	73	744.00	10	537.00				
	7	73	344.00	14	385.00				
	8	73	[illegible]	19	36.00				
	9	73	[illegible]	9	34.60				
	10	73	[illegible]	13	440.00				
3609N1	11	72	[illegible]	5	334.00				
	12	72	793.00	1	404.00	30	313.00		
	1	73	821.00						
	2	73	772.00	28	250.00				
	3	73	1680.00	3	290.00	29	800.00		
	4	73	755.00	16	875.00	27	760.00		
	5	73	1340.00	15	560.00	30	970.00		
	6	73	1390.00						
	7	73	639.00	1	1700.00				
	8	73	414.00	30	73.00				
	9	73	592.00						
	10	73	533.00	4	340.00				
3609P1	11	72	103.00	5	30.30				
	12	72	110.00	1	36.70	30	28.40		
	1	73	114.00						
	2	73	107.00	28	22.30				
	3	73	233.00	29	69.50				
	4	73	260.00	16	76.50	27	65.50		
	5	73	187.00	15	48.00	30	77.00		
	6	73	192.00						
	7	73	88.60	1	145.00				
	8	73	57.30	30	1.65				
	9	73	82.10						
	10	73	73.70	4	20.00				

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3609 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3609Q1	11	72	95.10	5	34.40				
	12	72	101.00	1	41.80	30	32.30		
	1	73	105.00						
	2	73	98.50	28	25.40				
	3	73	214.00	29	100.00				
	4	73	239.00	16	109.00	28	94.00		
	5	73	172.00	15	69.00	30	125.00		
	6	73	177.00						
	7	73	81.50	1	230.00				
	8	73	52.70	30	5.90				
	9	73	75.50						
	10	73	67.00	4	30.00				
3609R1	11	72	884.00	5	765.00				
	12	72	941.00	1	927.00	30	716.00		
	1	73	97.40						
	2	73	916.00	28	565.00				
	3	73	990.00	29	1520.00				
	4	73	2230.00	16	1650.00				
	5	73	1600.00	1	1370.00	15	1130.00	30	1200.00
	6	73	1640.00						
	7	73	757.00	1	2540.00				
	8	73	491.00	30	180.00				
	9	73	702.00						
	10	73	630.00	5	919.00				
3609S1	11	72	14.30	5	9.60				
	12	72	15.20	2	10.00				
	1	73	15.70	6	12.40				
	2	73	14.80	3	15.80				
	3	73	32.10	3	8.20				
	4	73	36.00	7	34.40	17	21.00		
	5	73	25.00	5	13.00	19	33.00		
	6	73	26.50	1	26.70	30	17.50		
	7	73	12.20						
	8	73	7.93	5	6.80				
	9	73	11.40	8	4.30				
	10	73	10.20	5	10.70				
3609T1	11	72	73.00	5	40.50				
	12	72	78.40	2	42.20	30	38.00		
	1	73	81.20						
	2	73	76.30	28	30.00				
	3	73	166.00	29	129.00				
	4	73	186.00	16	140.00				
	5	73	133.00	1	113.00	15	89.00	30	135.00
	6	73	137.00						
	7	73	63.20	1	238.00				
	8	73	40.90						
	9	73	58.60						
	10	73	52.60	4	31.40				

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3609 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
360901	11	72	432.00	5	217.00				
	12	72	459.00	2	224.00	30	203.00		
	1	73	475.00						
	2	73	447.00	28	160.00				
	3	73	971.00	29	550.00				
	4	73	1090.00	16	595.00	27	520.00		
	5	73	781.00	15	400.00	30	670.00		
	6	73	804.00						
	7	73	370.00	1	1370.00				
	8	73	240.00						
	9	73	343.00						
	10	73	308.00	4	145.00				
360927	11	72	2130.00	5	1850.00				
	12	72	2270.00	2	1920.00				
	1	73	2350.00	4	2760.00				
	2	73	2210.00	13	1840.00				
	3	73	4800.00	4	1750.00	29	3680.00		
	4	73	5380.00	16	3980.00	27	3510.00		
	5	73	3860.00	7	2800.00	19	4830.00	30	3100.00
	6	73	3970.00	10	2630.00				
	7	73	1830.00	1	6150.00				
	8	73	1190.00	5	1640.00	30	454.00		
	9	73	1690.00	11	1310.00				
	10	73	1520.00	4	1670.00				

TRIBUTARY FLOW INFORMATION FOR VERMONT 12/27/76

LAKE CODE 5001 LAKE CHAMPLAIN

TOTAL DRAINAGE AREA OF LAKE 8277.00

TRIBUTARY	SUB-DRAINAGE AREA	NORMALIZED FLOWS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
500191	2.51	3.36	2.90	6.68	16.10	6.95	3.39	1.87	1.42	2.00	3.54	6.92	3.99	4.72
500177	1683.00	1530.00	1640.00	2600.00	4770.00	3160.00	1990.00	1330.00	1070.00	1110.00	1340.00	1560.00	1560.00	1973.23
500121	19.10	22.70	18.60	41.10	105.00	41.20	26.30	16.00	14.40	16.40	26.40	33.00	27.10	33.14
500135	1362.30	1179.00	967.00	2666.00	5916.00	2751.00	1211.00	652.00	494.00	599.00	913.00	1447.00	1296.00	1637.70
500141	715.33	858.00	697.00	1537.00	3916.00	1916.00	980.00	500.00	557.00	633.00	915.00	1250.00	1015.00	1239.71
500151	46.10	51.30	42.00	107.00	244.00	119.00	52.60	28.30	21.60	26.00	40.50	65.00	54.20	71.07
500161	861.36	1119.00	830.60	2271.00	5946.00	2385.00	1162.00	661.50	556.00	686.00	1214.00	1600.00	1369.00	1619.93
500181	872.00	1188.00	1073.00	2014.00	3594.00	2128.00	1125.00	692.00	527.00	618.00	720.00	1090.00	1125.00	1321.69
500192	261.90	311.00	313.00	445.00	911.10	410.00	225.00	134.00	80.90	120.00	144.00	240.00	300.00	319.77

NOTE *** NO OUTLET GAGE IN THE U.S.

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
500191	7	72	6.06	15	2.02				
	8	72	3.29	12	3.36				
	9	72	0.86	10	1.09				
	10	72	2.09	15	1.77				
	11	72	5.61	4	4.02				
	12	72	5.49	4	4.47				
	1	73	4.52						
	2	73	4.79	3	5.53				
	3	73	14.96	3	3.51				
	4	73	11.30	7	12.10	19	15.80		
	5	73	19.40	6	6.40	14	9.50		
	6	73	7.66						
	7	73	5.73	8	3.20				
500177	11	72	2130.00	5	1850.00				
	12	72	2270.00	2	1920.00				
	1	73	2350.00	4	2760.00				
	2	73	2210.00	13	1460.00				
	3	73	4400.00	4	1750.00	29	3640.00		
	4	73	5390.00	16	3940.00	27	3510.00		
	5	73	3860.00	7	2400.00	19	4430.00	30	3100.00
	6	73	3470.00	10	2430.00				
	7	73	1830.00	1	6150.00				

TRIBUTARY FLOW INFORMATION FOR VERMONT 12/27/74

LAKE CODE 5031 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
500121	7	72	14.16	15	14.10				
	8	72	17.10	12	14.40				
	9	72	10.40						
	10	72	22.13	4	15.60	15	21.30		
	11	72	55.70	6	26.70				
	12	72	35.50	2	26.76				
	1	73	43.70	13	43.00				
	2	73	32.60	10	31.50				
	3	73	46.30	10	52.30				
	4	73	91.40	7	96.10	15	44.30	21	79.00
	5	73	72.73	12	80.80				
	6	73	70.70	3	66.30				
500135	7	72	1530.00	15	522.00				
	8	72	717.00	12	536.00				
	9	72	269.00	16	207.00				
	10	72	595.00	14	187.00				
	11	72	2155.00	5	964.00				
	12	72	2009.00	2	1700.00				
	1	73	2063.00	4	1490.00				
	2	73	1459.00						
	3	73	3656.00	3	1360.00				
	4	73	5056.00	7	5920.00	21	3972.00		
	5	73	4264.00	5	3521.00	13	3476.00		
	6	73	4304.00	10	2262.00				
500141	7	72	1274.00	15	674.00				
	8	72	641.00	12	887.00				
	9	72	301.00						
	10	72	830.00	4	560.00	15	786.00		
	11	72	1522.00	4	1000.00				
	12	72	1336.00	2	1000.00				
	1	73	1639.00	13	1604.00				
	2	73	1220.00	10	1146.00				
	3	73	3228.00	10	1960.00				
	4	73	3619.00	7	3545.00	21	2489.00		
	5	73	2721.00	12	3024.00				
	6	73	2646.00	3	2681.00				
500151	7	72	56.40	15	22.70				
	8	72	31.10	12	27.70				
	9	72	11.50	13	12.40				
	10	72	25.80	14	8.10				
	11	72	93.60	5	41.20				
	12	72	67.10	1	76.40				
	1	73	49.40	6	64.50				
	2	73	63.00	3	120.90				
	3	73	143.00	3	46.11				
	4	73	220.20	7	257.00	22	177.00		
	5	73	146.00	5	147.00	14	144.00		
	6	73	140.00						
	7	73	149.10	8	131.00				

TRIBUTARY FLOW INFORMATION FOR VERMONT 12/27/74

LAKE CODE 5001 LAKE CHAMPLAIN

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
500161	7	72	2277.00	15	646.00				
	8	72	1124.00	12	1164.00				
	9	72	244.00	23	237.00				
	10	72	716.00	15	616.00				
	11	72	1924.00	4	1149.00				
	12	72	2054.00	4	1536.00				
	1	73	2234.00	6	1380.00				
	2	73	1649.00	1	2249.00				
	3	73	5124.00	3	1206.00				
	4	73	3844.00	7	4150.00	15	2230.00		
	5	73	3554.00	6	2174.00	12	3633.00		
	6	73	2626.00						
	7	73	1444.00	8	1993.00				
500181	7	72	1997.00	15	2160.00				
	8	72	1090.00	12	950.00				
	9	72	505.00	10	457.00				
	10	72	857.00	14	958.00				
	11	72	2170.00	5	1460.00				
	12	72	2810.00	2	2760.00				
	1	73	3681.00	6	3030.00				
	2	73	1120.00	3	5060.00				
	3	73	3400.00	3	1020.00				
	4	73	2712.00	7	3453.00	22	2337.00		
	5	73	2341.00	6	1474.00	12	1875.00		
	6	73	1575.00						
	7	73	2345.00	8	4342.00				
500192	7	72	382.00	15	266.00				
	8	72	205.00	12	117.00				
	9	72	101.00	10	56.00				
	10	72	204.00	14	244.00				
	11	72	1060.00	4	540.00				
	12	72	900.00	9	1300.00				
	1	73	980.00	18	279.00				
	2	73	626.00	16	418.00				
	3	73	1040.00	10	1300.00				
	4	73	658.00	8	1065.00	22	290.00		
	5	73	541.00	5	146.00	16	446.00		
	6	73	212.00						

APPENDIX C

LAKE CHAMPLAIN DATA

COLLECTED BY THE

NATIONAL EUTROPHICATION SURVEY

```
STORET RETRIEVAL DATE 74/11/26
                                                                                360901
                                                                                43 33 00.0 073 27 00.0
                                                                                CHAMPLAIN LAKE
                                                                                36      NEW YORK

                                                                                11EPALES          2111202
                                                                                5                 0019 FEET  DEPTH

                              00010      00300      00077      00094      00400      00410     00630      00610      00665      00666
  DATE    TIME DEPTH  WATER       DO        TRANSP     CNDUCTVY     PH        T ALK    NO2&NO3     NH3-N     PHOS-TOT   PHOS-DIS
  FROM     OF          TEMP                 SECCHI     FIELD                  CACO3    N-TOTAL     TOTAL
   TO     DAY  FEET    CENT        MG/L     INCHES     MICROMHO     SU        MG/L       MG/L       MG/L      MG/L P     MG/L P

72/06/01 11 50 0000      19.6        8.6         15          90      7.10        31      0.030      0.060      0.020      0.007
         11 50 0016      16.5        6.6                    120      7.40        26      0.060      0.090      0.021      0.008
72/08/02 15 30 0000                              32                              52      0.090      0.070      0.020      0.007
         15 30 0004      23.9        8.2                    150      7.90        52      0.080      0.070      0.021      0.008
         15 30 0015      23.8        7.7                    150      7.90        52      0.090      0.070      0.026      0.007
72/10/08 09 30 0000                              13         185      7.80        72      0.080      0.120      0.033      0.012
         09 30 0004      14.2        9.[illegible]                    175      7.75        65      0.080      0.070      0.032      0.009



                             32217
  DATE    TIME DEPTH CHLRPHYL
  FROM     OF            A
   TO     DAY  FEET     UG/L

72/06/01 11 50 0000       1.5J
72/08/02 15 30 0000       6.4J
72/10/08 09 30 0000      16.7J


           J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                                    360902
                                                                   43 35 00.0 073 35 00.0
                                                                   CHAMPLAIN LAKE
                                                                   36      NEW YORK

                                                                   11EPALES              2111202
                                                                   5                     0020 FEET  DEPTH

                            00010      00300     00077      00094     00400     00410     00630     00610     00665     00666
  DATE     TIME DEPTH     WATER        DO      TRANSP    CNDUCTVY     PH      T ALK    NO2&NO3    NH3-N   PHOS-TOT  PHOS-DIS
  FROM      OF             TEMP                SECCHI    FIELD                CACO3    N-TOTAL    TOTAL
   TO      DAY   FEET      CENT       MG/L     INCHES    MICROMHO     SU       MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/01 12 35 0000        20.6        7.8         36        220      7.10        91     0.360     0.090     0.034     0.021
         12 35 0017        20.4        7.4                   210      7.20        91     0.360     0.090     0.035     0.024
72/08/02 15 10 0000                                24        220      7.70        78     0.410     0.090     0.060     0.028
         15 10 0004        21.9        7.7                   220      7.70        79     0.420     0.100     0.060     0.026
         15 10 0015        21.9        7.7                   220      7.60        79     0.420     0.100     0.061     0.026
72/10/08 09 50 0000                                 3        180      7.60        56     0.420     0.130     0.188     0.065
         09 50 0004        13.0        9.8                   180      7.60        54     0.430     0.150     0.159     0.068
         09 50 0009        13.0        9.6                   180      7.50        53     0.440     0.140     0.164     0.071

                            32217
  DATE     TIME DEPTH CHLRPHYL
  FROM      OF              A
   TO      DAY   FEET      UG/L

72/06/01 12 35 0000         9.3J
72/08/02 15 10 0000         3.6J
72/10/04 09 50 0000         7.[illegible]J


              J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                                  360903
                                                                 43 50 00.0 073 23 00.0
                                                                 CHAMPLAIN LAKE
                                                                 36      NEW YORK

                                                                 11EPALES            2111202
                                                                 5                  0022 FEET  DEPTH

                         00010     00300     00077      00094      00400     00410     00630     00610     00665     00666
  DATE    TIME DEPTH   WATER       DO      TRANSP    CNDUCTVY      PH      T ALK    NO2&NO3    NH3-N    PHOS-TOT  PHOS-DIS
  FROM     OF           TEMP                SECCHI    FIELD                  CACO3    N-TOTAL    TOTAL
   TO     DAY   FEET    CENT       MG/L     INCHES    MICROMHO      SU       MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/01 13 05 0000     19.4      11.2        48        160        7.90        65     0.020     0.040     0.014     0.008
         13 05 0010     18.5      11.0                  140        7.80        56     0.010K    0.010     0.012     0.006
         13 05 0019     15.6      10.1                  180        7.20        56     0.100     0.090     0.020     0.012
72/08/02 14 35 0000                           52        190        6.80        69     0.120     0.090     0.040     0.015
         14 35 0004     23.8       6.8                  200        7.70        80     0.120     0.120     0.032     0.017
         14 35 0015     23.7       7.3                                         78     0.120     0.110     0.033     0.017
         14 35 0020     23.4       6.4                  200        7.50        79     0.130     0.220     0.058     0.031
72/10/08 10 15 0000                           18        220        8.10        87     0.020     0.040     0.049     0.015
         10 15 0004     14.9       9.6                  220        8.15        85     0.030     0.050     0.058     0.014
         10 15 0011     14.9       9.6                  215        8.15        85     0.050     0.060     0.049     0.017


                         32217
  DATE    TIME DEPTH  CHLRPHYL
  FROM     OF             A
   TO     DAY   FEET    UG/L

72/06/01 13 05 0000       9.4J
72/08/02 14 35 0000      10.0J
72/10/08 10 15 0000      30.2J


              K  VALUE KNOWN TO BE LESS
                 THAN INDICATED

              J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                                      360904
                                                                     43 57 00.0 073 25 00.0
                                                                     CHAMPLAIN LAKE
                                                                     36      NEW YORK

                                                                     11EPALES              2111202
                                                                     5                    0025 FEET  DEPTH

                         00010      00300      00077      00094      00400      00410      00630      00610      00665      00666
  DATE    TIME DEPTH    WATER        DO       TRANSP    CNDUCTVY      PH       T ALK     NO2&NO3    NH3-N     PHOS-TOT   PHOS-DIS
  FROM     OF            TEMP                 SECCHI    FIELD                  CACO3     N-TOTAL    TOTAL
   TO     DAY   FEET     CENT        MG/L     INCHES    MICROMHO      SU        MG/L       MG/L      MG/L      MG/L P     MG/L P

72/06/01 13 45 0000      19.4        9.9         36         150      8.10         57      0.050     0.030      0.017      0.008
         13 45 0010      17.7        9.2                    150      7.70         57      0.070     0.060      0.013      0.009
         13 45 0024       9.0       11.0                    110      7.40         51      0.240     0.080      0.018      0.012
72/08/02 14 00 0000                              42         200      7.70         70      0.100     0.090      0.038      0.015
         14 00 0004      23.1        7.5                    200      7.70         70      0.100     0.090      0.032      0.017
         14 00 0015      22.5        6.3                    200      7.60         70      0.100     0.150      0.036      0.016
         14 00 0020      20.6        5.6                    180      7.40         65      0.140     0.150      0.040      0.017
72/10/08 10 40 0000                              11         245      7.75         72      0.100     0.170      0.073      0.020
         10 40 0004      15.0        8.9                    240      7.75         73      0.110     0.160      0.077      0.022
         10 40 0015      14.9        9.0                    235      7.80         72      0.090     0.140      0.070      0.020
         10 40 0035      14.9        8.9                    240      7.75         72      0.100     0.140      0.074      0.019

                        32217
  DATE    TIME DEPTH CHLRPHYL
  FROM     OF             A
   TO     DAY   FEET    UG/L

72/06/01 13 45 0000      8.8J
72/08/02 14 00 0000      2.7J
72/10/08 10 40 0000      9.8J

           J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                                       360905
                                                                      44 03 00.0 073 27 00.0
                                                                      CHAMPLAIN LAKE
                                                                      36       NEW YORK

                                                                      11EPALES            2111202
                                                                      5                   0021 FEET  DEPTH

                            00010      00300      00077     00094      00400      00410     00630      00610      00665     00666
  DATE    TIME DEPTH   WATER        DO     TRANSP    CNDUCTVY     PH       T ALK    NO26NO3     NH3-N    PHOS-TOT  PHOS-DIS
  FROM     OF          TEMP                SECCHI    FIELD                 CACO3    N-TOTAL     TOTAL
   TO     DAY  FEET    CENT       MG/L     INCHES    MICROMHO      SU       MG/L      MG/L       MG/L     MG/L P    MG/L P

72/06/01 14 20 0000      7.0       11.8        27         100     7.30         52     0.240      0.060     0.016     0.012
         14 20 0008      5.8       12.0                   100     7.30         50     0.290      0.010     0.013     0.005
         14 20 0017      5.1       12.0                   100     7.30         40     0.310      0.070     0.024     0.013
72/08/02 12 35 0000                             84        170     8.10         56     0.050      0.050     0.024     0.010
         12 35 0004     22.6        8.8                   160     8.10         57     0.070      0.060     0.022     0.009
         12 35 0010     22.3        8.9                   160     8.00         56     0.080      0.080     0.022     0.012
         12 35 0017     22.0        8.1                   160     8.00         57     0.070      0.060     0.013     0.010
72/10/08 11 10 0000                             60        160     7.75         49     0.130      0.040     0.020     0.009
         11 10 0004     13.8        9.6                   155     7.70         50     0.120      0.030     0.022     0.011
         11 10 0015     13.6        9.4                   155     7.70         50     0.130      0.030     0.020     0.009

                            32217
  DATE    TIME DEPTH   CHLRPHYL
  FROM     OF             A
   TO     DAY  FEET      UG/L

72/06/01 14 20 0000        1.2J
72/08/02 12 35 0000       67.7J
72/10/08 11 10 0000        8.5J


               J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                         360906
                                                        44 11 00.0 073 26 00.0
                                                        CHAMPLAIN LAKE
                                                        36      NEW YORK

                                                        11EPALES             2111202
                                                        5                    0038 FEET  DEPTH

                         00010       00300      00077      00094      00400     00410     00630     00610     00665     00666
  DATE    TIME DEPTH    WATER         DO       TRANSP    CNDUCTVY      PH       T ALK    NO2&NO3    NH3-N   PHOS-TOT  PHOS-DIS
  FROM     OF             TEMP                   SECCHI    FIELD                 CACO3    N-TOTAL    TOTAL
   TO     DAY  FEET      CENT        MG/L      INCHES    MICROMHO      SU       MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/01 16 25 0000      14.2        13.1          72        120      8.60        51     0.050     0.010     0.013     0.006
         16 25 0009      14.0        12.9                    120      8.50        49     0.060     0.050     0.015     0.008
         16 25 0020      10.0        11.9                    110      7.60        51     0.180     0.060     0.012     0.008
72/07/30 10 55 0000                               120                             51     0.060     0.060     0.013     0.010
         10 55 0004      21.7         9.6                    150      8.30        50     0.060     0.050     0.015     0.008
         10 55 0015      20.9         9.6                    150      8.00        50     0.090     0.060     0.017     0.010
         10 55 0030      12.2         9.6                    150      7.40        46     0.280     0.060     0.012     0.009
         10 55 0041       9.2         9.4                    150      7.20        47     0.300     0.040     0.015     0.012
         10 55 0051       8.3        10.1                    150      7.40        46     0.300     0.050     0.017     0.014
72/10/08 11 30 0000                               126        145      8.05        73     0.080     0.030     0.016     0.009
         11 30 0004      14.3        10.3                    150      8.10        22     0.090     0.020     0.016     0.009
         11 30 0015      14.2        10.4                    145      8.05        23     0.080     0.020     0.018     0.008
         11 30 0034      14.1        10.0                    155      7.85        23     0.090     0.040     0.016     0.008


                        32217
  DATE    TIME DEPTH CHLRPHYL
  FROM     OF            A
   TO     DAY   FEET     UG/L

72/06/01 16 25 0000      20.7J
72/07/30 10 55 0000      12.9J
72/10/08 11 30 0000      12.9J


      J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                          360907
                                                         44 31 00.0 073 16 00.0
                                                         LAKE CHAMPLAIN
                                                         36      NEW YORK

                                                         11EPALES            2111202
                                                         5                  0020 FEET  DEPTH

                        00010     00300     00077     00094     00400     00410     00630     00610     00665     00666
 DATE    TIME DEPTH     WATER        DO    TRANSP  CNDUCTVY        PH     T ALK   NO2&NO3     NH3-N  PHOS-TOT  PHOS-DIS
 FROM     OF             TEMP              SECCHI     FIELD               CACO3   N-TOTAL     TOTAL
  TO     DAY  FEET       CENT      MG/L    INCHES  MICROMHO        SU      MG/L      MG/L      MG/L    MG/L P    MG/L P

72/06/02 10 10 0000      11.5      12.3        96       160      8.30        47     0.150     0.060     0.024     0.008
         10 47 0000      11.4                  84       140      8.00        45     0.190     0.030     0.012     0.006
         10 47 0005      10.1      12.4                 140      8.20        45     0.180     0.020     0.010     0.005
         10 47 0015       8.5                           140      8.00        44     0.190     0.030     0.012     0.006
72/07/30 12 50 0000                           144       140      8.10        46     0.060     0.050     0.013     0.005
         12 50 0004      22.3       9.6                 140      8.10        46     0.060     0.030     0.015     0.009
         12 50 0015      21.4       9.4                 140      7.50        44     0.080     0.040     0.017     0.009
         12 50 0030      20.3       8.4                 120      7.10        38     0.200     0.090     0.032     0.014
         12 50 0060      14.4       8.6                 145      7.00        48     0.230     0.040     0.015     0.009
         12 50 0090       7.2      11.0                 145      6.90        47     0.310     0.040     0.019     0.016
         12 50 0120       6.0      11.0                 150      6.90        48     0.320     0.040     0.020     0.016
         14 30 0000                           144       140      8.30        46     0.080     0.060     0.013     0.011
         14 30 0004      22.7      10.0                 140      8.30        46     0.080     0.050     0.015     0.009
         14 30 0015      21.2       9.8                 130      7.90        43     0.120     0.050     0.015     0.010
         14 30 0050      15.2       8.4                 145      7.10        48     0.220     0.060     0.013     0.009
         14 30 0075       8.8      10.2                 145      7.00        47     0.300     0.040     0.018     0.015
         14 30 0117       6.5      11.2                 150      7.00        47     0.310     0.040     0.022     0.017
72/10/08 13 05 0000                           144       140      7.70        43     0.160     0.040     0.018     0.009
         13 05 0004      13.3       9.9                 140      7.75        45     0.160     0.030     0.012     0.007
         13 05 0015      13.3      10.2                 140      7.75        43     0.160     0.020     0.012     0.006


                        32217
 DATE    TIME DEPTH  CHLRPHYL
 FROM     OF             A
  TO     DAY  FEET      UG/L

72/06/02 10 10 0000      29.2J
         10 47 0000      12.4J
72/07/30 12 50 0000       9.9J
         14 30 0000      10.7J
72/10/08 13 05 0000       8.9J

            J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                                  360908
                                                                 44 37 00.0 073 16 00.0
                                                                 LAKE CHAMPLAIN
                                                                 36013   NEW YORK

                                                                 11EPALES                2111202
                                                                 5                      0068 FEET  DEPTH

                               00010       00300      00077      00094       00400      00410      00630      00610      00665      00666
 DATE      TIME DEPTH  WATER        DO       TRANSP    CNDUCTVY      PH       T ALK     NO2&NO3    NH3-N     PHOS-TOT   PHOS-DIS
 FROM       OF            TEMP                  SECCHI    FIELD                    CACO3     N-TOTAL    TOTAL
  TO        DAY   FEET    CENT        MG/L      INCHES    MICROMHO      SU        MG/L      MG/L       MG/L      MG/L P     MG/L P

72/07/30 09 40 0000                              172         100       7.30         34     0.170      0.050      0.010      0.007
         09 40 0004       23.2         8.6                   100       7.20         34     0.170      0.040      0.013      0.009
         09 40 0015       22.8         7.6                   100       7.20         36     0.180      0.060      0.015      0.009
         09 40 0024       22.3         8.4                   100       7.10         34     0.190      0.060      0.016      0.010
         09 40 0034       21.6         8.0                   105       6.80         33     0.190      0.070      0.021      0.012
         09 40 0044       13.8         7.0                   105       6.80         30     0.340      0.040      0.011      0.010
         09 40 0054        9.5         7.4                   105       6.60         29     0.380      0.030      0.013      0.010
         09 40 0064        7.5         6.6                   100       6.60         28     0.400      0.040      0.017      0.013
72/10/05 15 30 0000                              168         112       7.35         32     0.150      0.040      0.008      0.006
         15 30 0004       15.3         9.8                   108       7.35         27     0.150      0.040      0.008      0.005
         15 30 0015       15.3         9.8                   123       7.30         31     0.150      0.040      0.008      0.006
         15 30 0040       15.1         9.3                   120       7.38         31     0.160      0.050      0.007      0.005
         15 30 0080        8.3         2.4                   105       6.43         28     0.390      0.050      0.012      0.009


                         32217
 DATE      TIME DEPTH CHLRPHYL
 FROM       OF            A
  TO        DAY   FEET    UG/L

72/07/30 09 40 0000       4.9J
72/10/05 15 30 0000       5.5J


          J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                        360909
                                                       44 33 00.0 073 25 00.0
                                                       LAKE CHAMPLAIN
                                                       36      NEW YORK

                                                       11EPALES           2111202
                                                       5                  0065 FEET  DEPTH

                         00010     00300     00077     00094      00400     00410     00630     00610     00665     00666
  DATE    TIME DEPTH    WATER       DO      TRANSP   CNDUCTVY      PH      T ALK    NO2&NO3    NH3-N    PHOS-TOT  PHOS-DIS
  FROM     OF            TEMP               SECCHI   FIELD                 CACO3    N-TOTAL    TOTAL
   TO     DAY   FEET     CENT      MG/L     INCHES   MICROMHO      SU       MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/02 10 30 0000      11.4      11.8         84        140     8.20        42     0.160     0.060     0.030     0.008
72/07/30 11 30 0000                            151        130     7.60        40     0.080     0.060     0.019     0.009
         11 30 0004      21.4       9.2                   130     7.60        39     0.070     0.060     0.015     0.009
         11 30 0015      21.1       9.0                   100     7.00        36     0.080     0.060     0.017     0.010
         11 30 0025      18.9       7.2                   140     6.90        29     0.120     0.060     0.020     0.010
         11 30 0045      12.9       8.0                   140     6.80        43     0.250     0.030     0.013     0.010
         11 30 0060      11.3       8.8                   145     6.80        42     0.270     0.030     0.014     0.011
72/10/05 17 00 0000                            156        140     7.40        43     0.150     0.040     0.009     0.006
         17 00 0004      13.8      10.0                   142     7.50        42     0.150     0.040     0.012     0.005
         17 00 0015      13.7       9.5                   142     7.45        43     0.150     0.040     0.010     0.006
         17 00 0050      13.5      10.0                   142     7.40        43     0.150     0.050     0.010     0.006
         17 00 0085      13.0       9.6                   142     7.30        42     0.170     0.050     0.010     0.006
         17 00 0116      12.0       9.2                   143     7.20        43     0.200     0.050     0.014     0.008


                         32217
  DATE    TIME DEPTH CHLRPHYL
  FROM     OF            A
   TO     DAY   FEET     UG/L

72/06/02 10 30 0000      12.8J
72/07/30 11 30 0000       7.9J
72/10/05 17 00 0000       5.4J


                J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                           360910
                                                           44 42 00.0 073 26 00.0
                                                           LAKE CHAMPLAIN
                                                           36      NEW YORK

                                                           11EPALES            2111202
                                                           5                   0022 FEET  DEPTH
                           00010     00300     00077     00094      00400     00410     00630     00610     00665     00666
  DATE     TIME DEPTH    WATER       DO      TRANSP    CNDUCTVY      PH      T ALK    NO2&NO3    NH3-N   PHOS-TOT  PHOS-DIS
  FROM      OF            TEMP                SECCHI    FIELD                 CACO3    N-TOTAL    TOTAL
   TO      DAY  FEET      CENT      MG/L     INCHES    MICROMHO     SU        MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/02 11 00 0000       11.7      10.9        96        120      7.50        36     0.160     0.010     0.026     0.009
         11 00 0010       11.5      11.0                  120      7.60        34     0.160     0.020     0.021     0.009
         11 00 0024       11.4      11.2                  120      7.60        36     0.150     0.010K    0.027     0.007
72/07/30 09 00 0000                             72        125      7.00        38     0.070     0.050     0.040     0.015
         09 00 0004       22.0       7.8                  120      6.90        39     0.070     0.050     0.037     0.014
         09 00 0015       21.4       6.6                  130      7.10        38     0.070     0.050     0.027     0.013
         09 00 0020       20.7       6.6                  130      6.80        38     0.090     0.070     0.026     0.012
72/10/05 16 30 0000                            168        141      7.75        40     0.100     0.040     0.013     0.007
         16 30 0004       14.3      10.5                  141      7.78        41     0.100     0.040     0.015     0.008
         16 30 0015       14.3      10.4                  140      7.75        40     0.100     0.040     0.016     0.006

                          32217
  DATE     TIME DEPTH CHLRPHYL
  FROM      OF            A
   TO      DAY  FEET      UG/L

72/06/02 11 00 0000       11.1J
72/07/30 09 00 0000        8.5J
72/10/05 16 30 0000        5.6J

               K  VALUE KNOWN TO BE LESS
                  THAN INDICATED

               J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                             360911
                                                             44 46 30.0 073 10 00.0
                                                             LAKE CHAMPLAIN
                                                             36      NEW YORK

                                                             11EPALES              2111202
                                                             4                     0021 FEET  DEPTH

                             00010      00300      00077       00094      00400      00410     00630     00610     00665     00666
 DATE     TIME DEPTH  WATER       DO      TRANSP    CNDUCTVY       PH      T ALK    NO2&NO3    NH3-N    PHOS-TOT  PHOS-DIS
 FROM      OF          TEMP                SECCHI    FIELD                   CACO3    N-TOTAL    TOTAL
  TO      DAY   FEET   CENT       MG/L     INCHES    MICROMHO       SU       MG/L      MG/L      MG/L     MG/L P    MG/L P

72/06/02 11 40 0000      14.9       11.0         84         130     8.20         38     0.030     0.020     0.032     0.012
         11 40 0015      14.0       11.1                    130     8.10         39     0.020     0.020     0.024     0.009
72/07/30 08 30 0000                             178         130     7.70         38     0.020     0.040     0.029     0.020
         08 30 0004      22.7        9.2                    130     7.70         38     0.020     0.040     0.032     0.023
         08 30 0017      22.3        5.2                    130     7.60         38     0.030     0.040     0.030     0.021
72/10/05 14 30 0000                             168         130     7.55         36     0.040     0.030     0.042     0.035
         14 30 0004      15.5       10.3                    132     7.80         35     0.040     0.040     0.041     0.034
         14 30 0014      15.5       10.2                    132     7.70         35     0.050     0.040     0.043     0.034


                          32217
 DATE     TIME DEPTH CHLRPHYL
 FROM      OF            A
  TO      DAY   FEET    UG/L

72/06/02 11 40 0000      13.6J
72/07/30 08 30 0000      11.2J
72/10/05 14 30 0000       5.5J


       J  VALUE KNOWN TO BE IN ERROR
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STORET RETRIEVAL DATE 74/11/26
                                                              360912
                                                              44 15 00.0 073 17 00.0
                                                              LAKE CHAMPLAIN
                                                              36      NEW YORK

                                                              11EPALES             2111202
                                                              5                    0038 FEET  DEPTH

                       00010      00300      00077      00094      00400      00410      00630      00610      00665      00666
 DATE    TIME DEPTH  WATER         DO      TRANSP     CNDUCTVY      PH       T ALK     NO2&NO3     NH3-N    PHOS-TOT   PHOS-DIS
 FROM     OF          TEMP                 SECCHI     FIELD                  CACO3     N-TOTAL     TOTAL
  TO     DAY  FEET    CENT       MG/L      INCHES     MICROMHO      SU        MG/L       MG/L       MG/L      MG/L P     MG/L P

72/06/02 14 00 0000     12.7       12.4        100        160      8.30         48      0.160      0.010      0.021      0.011
         14 00 0010     11.4       12.0                   160      8.10         52      0.170      0.010      0.011      0.006
         14 00 0027      8.4       11.8                   160      7.70         49      0.220      0.020      0.020      0.007
72/07/30 09 15 0000                             84        160      8.30         52      0.060      0.080      0.032      0.017
         09 15 0004     22.8        9.6                   150      8.40         51      0.050      0.060      0.031      0.014
         09 15 0015     22.7        9.6                   150      8.40         46      0.190      0.060      0.029      0.012
         09 15 0027     15.2        9.2                   150      7.40         49      0.100      0.060      0.032      0.012
         09 15 0034     11.5        8.8                   150      7.40         44      0.270      0.050      0.015      0.012
72/10/08 11 55 0000                            144        155      7.70         46      0.140      0.030      0.012      0.008
         11 55 0004     13.9       10.0                   150      7.70         43      0.150      0.030      0.013      0.007
         11 55 0015     13.5        9.7                   155      7.65         48      0.150      0.020      0.015      0.007
         11 55 0026     12.4        9.2                   155      7.50         46      0.200      0.020      0.016      0.010


                      32217
 DATE    TIME DEPTH CHLRPHYL
 FROM     OF           A
  TO     DAY  FEET    UG/L

72/06/02 14 00 0000       1.8J
72/07/30 09 15 0000       6.7J
72/10/08 11 55 0000       7.2J


       J  VALUE KNOWN TO BE IN ERROR
```

STORET RETRIEVAL DATE 74/11/26

340913
44 56 00.0 073 20 30.0
LAKE CHAMPLAIN
36019 NEW YORK

11EPALES 2111202
5 0017 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/06/02	15 15	0000	13.5	11.6	125	130	8.20	41	0.140	0.050	0.017	0.007
	15 15	0010	12.8	12.0		130	8.30	37	0.150	0.060	0.017	0.005
	15 15	0025	12.4	11.8		130	8.10	38	0.150	0.070	0.012	0.004
72/07/30	08 00	0000			132	135	7.60	42	0.050	0.050	0.020	0.013
	08 00	0004	21.8	7.8		130	7.40	43	0.040	0.060	0.042	0.019
	08 00	0015	21.1	8.2		140	7.20	42	0.070	0.060	0.022	0.012
72/10/05	16 05	0000			168	146	7.80	44	0.100	0.050	0.006	0.004
	16 05	0004	14.8	10.4		146	7.85	44	0.100	0.050	0.011	0.007
	16 05	0015	14.7	10.6		145	7.80	46	0.100	0.060	0.010	0.007

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/06/02	15 15	0000	10.1J
72/07/30	08 00	0000	12.3J
72/10/05	16 05	0000	2.4J

J VALUE KNOWN TO BE IN ERROR

```
STORET RETRIEVAL DATE 74/11/26
                                                                    360914
                                                                   44 38 00.0 073 15 00.0
                                                                   LAKE CHAMPLAIN
                                                                   36013   NEW YORK

                                                                   11EPALES              2111202
                                                                   5                    0006 FEET  DEPTH

                      00010      00300      00077      00094      00400      00410      00630      00610      00665      00666
  DATE   TIME DEPTH  WATER        DO       TRANSP    CNDUCTVY      PH       T ALK     NO2&NO3     NH3-N     PHOS-TOT   PHOS-DIS
  FROM    OF          TEMP                 SECCHI    FIELD                  CACO3     N-TOTAL     TOTAL
   TO    DAY  FEET    CENT       MG/L      INCHES    MICROMHO      SU        MG/L       MG/L       MG/L      MG/L P     MG/L P

72/07/30 09 10 0000                             72        100      7.20         31      0.180      0.060      0.018      0.012
         09 10 0004    22.4        8.0                    100      7.00         30    . 0.180      0.050      0.016      0.011



                      32217
  DATE   TIME DEPTH CHLRPHYL
  FROM    OF           A
   TO    DAY  FEET    UG/L

72/07/30 09 10 0000      4.9J



          J  VALUE KNOWN TO BE IN ERROR
```

APPENDIX D

ALGAL ASSAY GROWTH CURVES AND CHEMISTRY
FOR
EPA AND VERMONT-BEAK SAMPLES

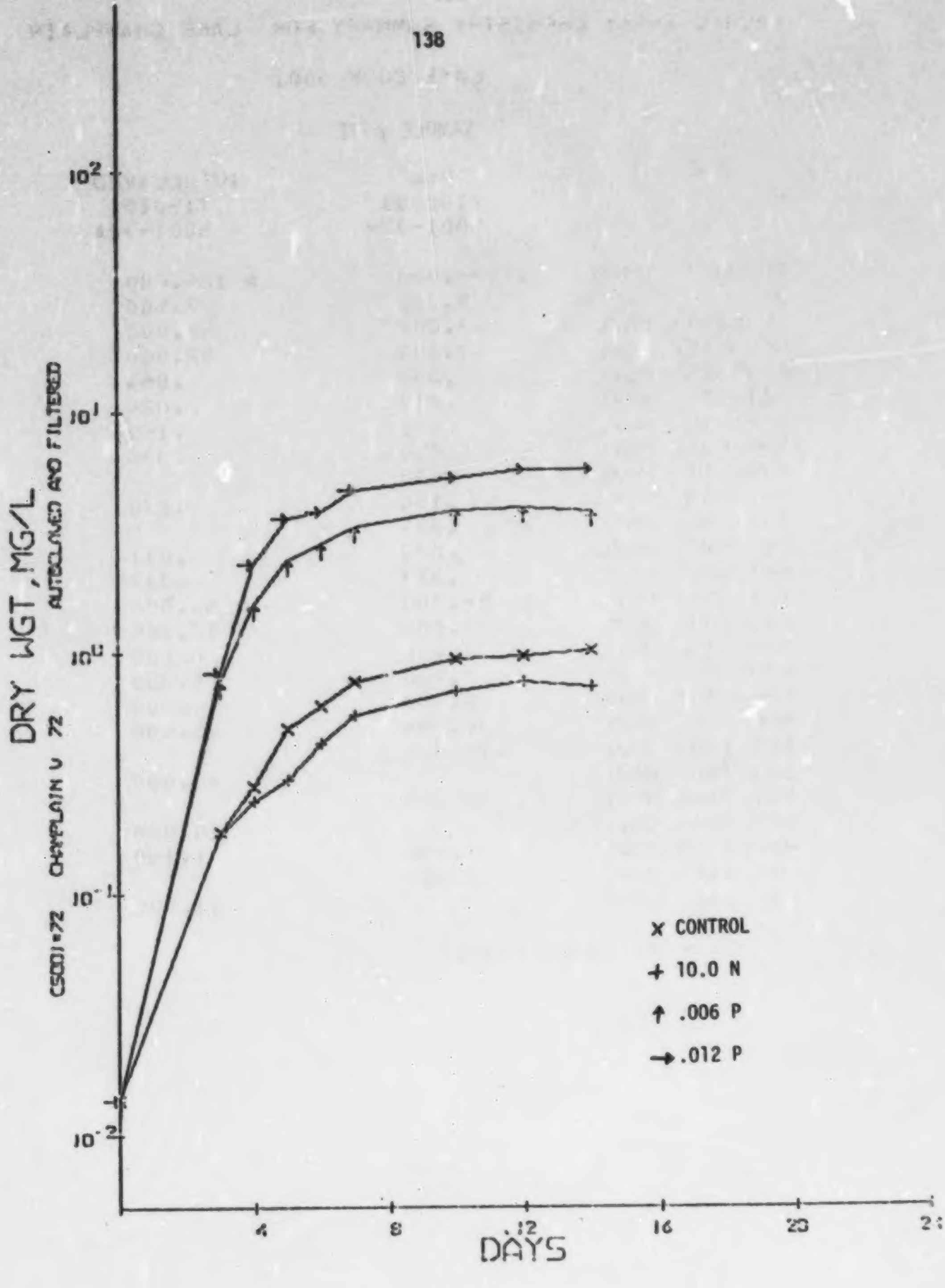
ALGAL ASSAY CHEMISTRY SUMMARY FOR LAKE CHAMPLAIN

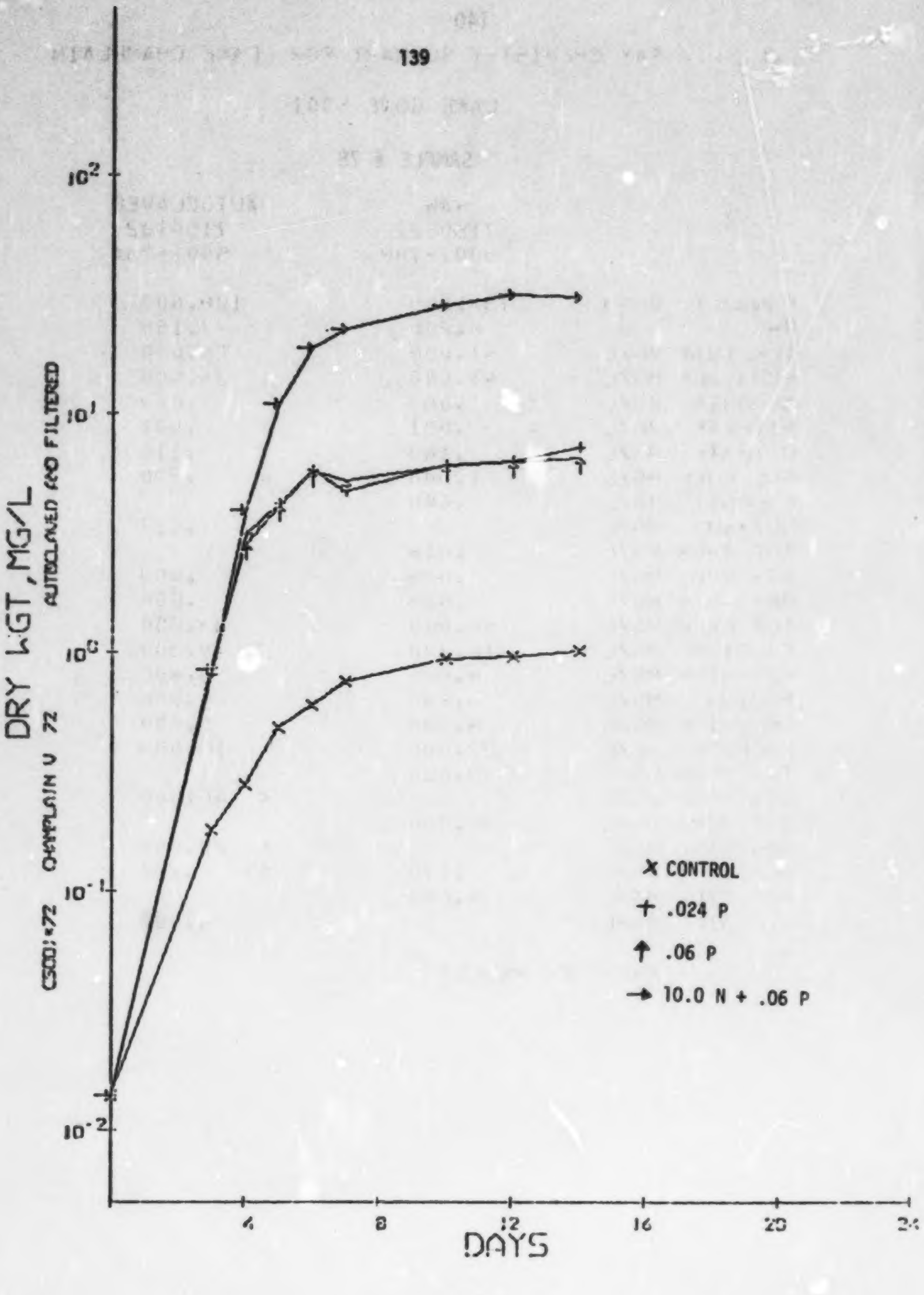
LAKE CODE 5001

SAMPLE # 72

		RAW 7150001 5001-72R	AUTOCLAVED 7150101 5001-72A
CONDUCT	UMHO	A 126.000	A 184.000
PH		8.300	7.500
ALKLINTY	MG/L	47.000	52.000
HCO3 ALK	MG/L	47.000	52.000
AMMONIA	MG/L	.050	.064
NITRITE	MG/L	.017	.024
NITRATE	MG/L	.091	.150
SOL KJEL	MG/L	1.050	.350
KJELNIT	MG/L	.630	
NO2+NO3	MG/L	.104	.170
TOT PHOS	MG/L	A .079	
DIS PHOS	MG/L	.022	.011
ORT AS P	MG/L	.017	.012
TOT HARD	MG/L	A 56.000	64.000
CALCIUM	MG/L	51.000	17.700
MAGNSIUM	MG/L	4.400	6.000
SODIUM	MG/L	3.800	6.300
CHLORIDE	MG/L	8.000	9.000
SULFATE	MG/L	36.000	25.000
TOT IRON	UG/L	470.000	
DIS IRON	UG/L		< 40.000
TOT MANG	UG/L	20.000	
DIS MANG	UG/L		20.000
REACT SI	MG/L	.880	1.150
DIC TIC	MG/L	12.000	
DIC DIC	MG/L		11.000

A - AVERAGED RESULT


DRY WGT, MG/L
AUTOCLAVED AND FILTERED
CS001-72 CHAMPLAIN U 72
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
DAYS
× CONTROL
+ 10.0 N
↑ .006 P
→ .012 P

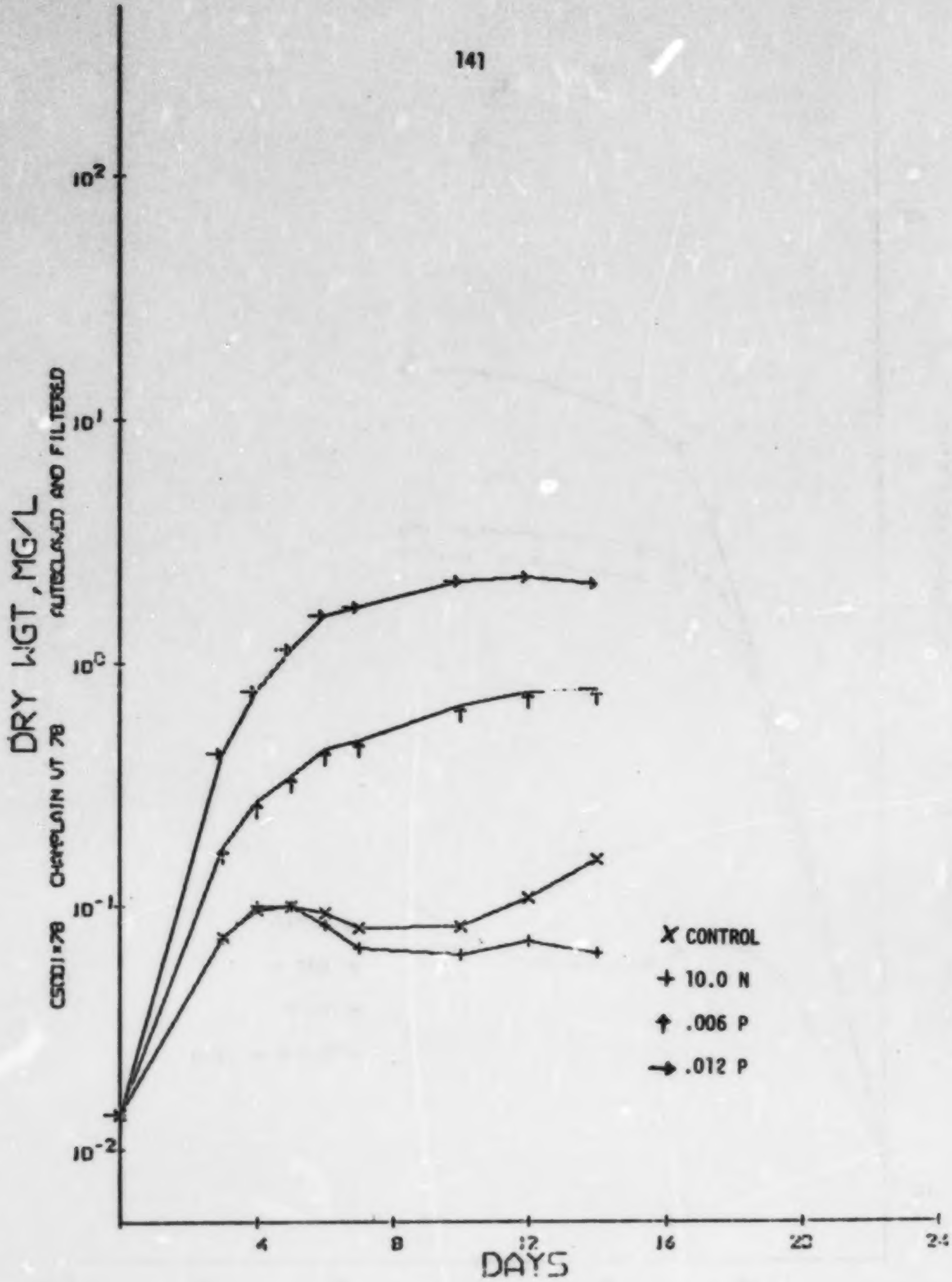

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
CSOD:72 CHAMPLAIN U 72
10²
10¹
10⁰
10⁻¹
10⁻²
4
8
12
16
20
24
DAYS
X CONTROL
+ .024 P
↑ .06 P
→ 10.0 N + .06 P

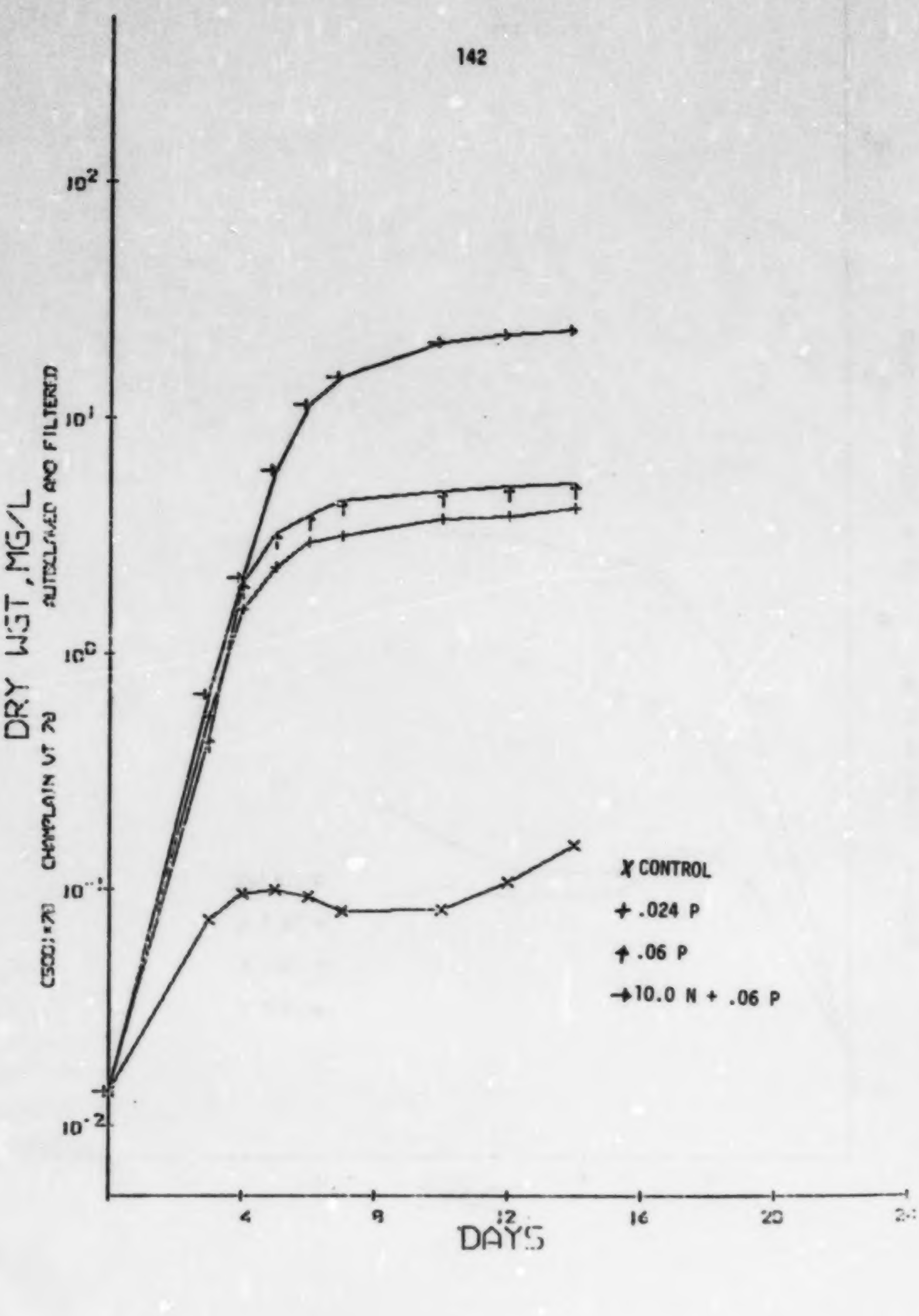
ALGAL ASSAY CHEMISTRY SUMMARY FOR LAKE CHAMPLAIN

LAKE CODE 5001

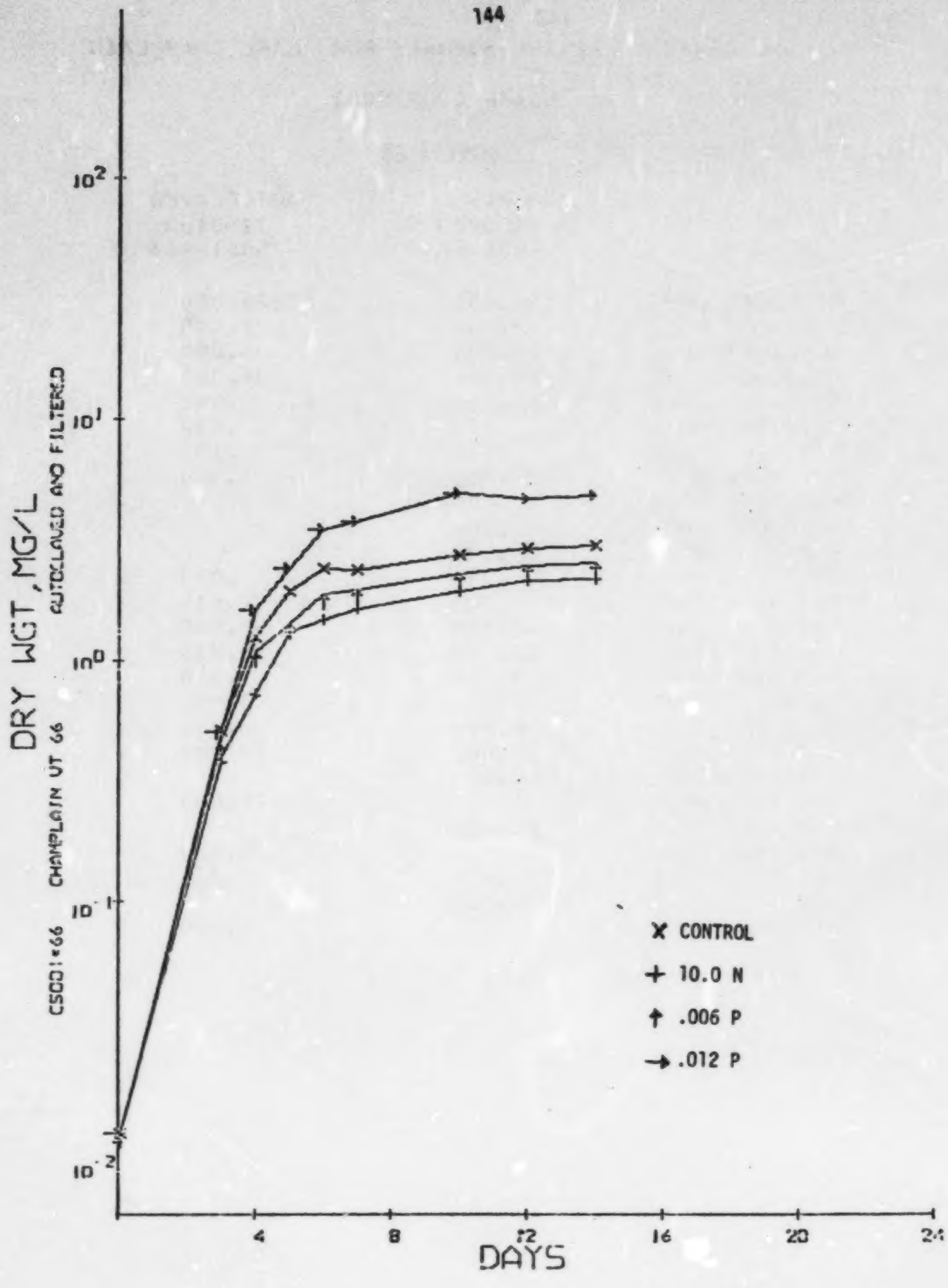
SAMPLE # 78

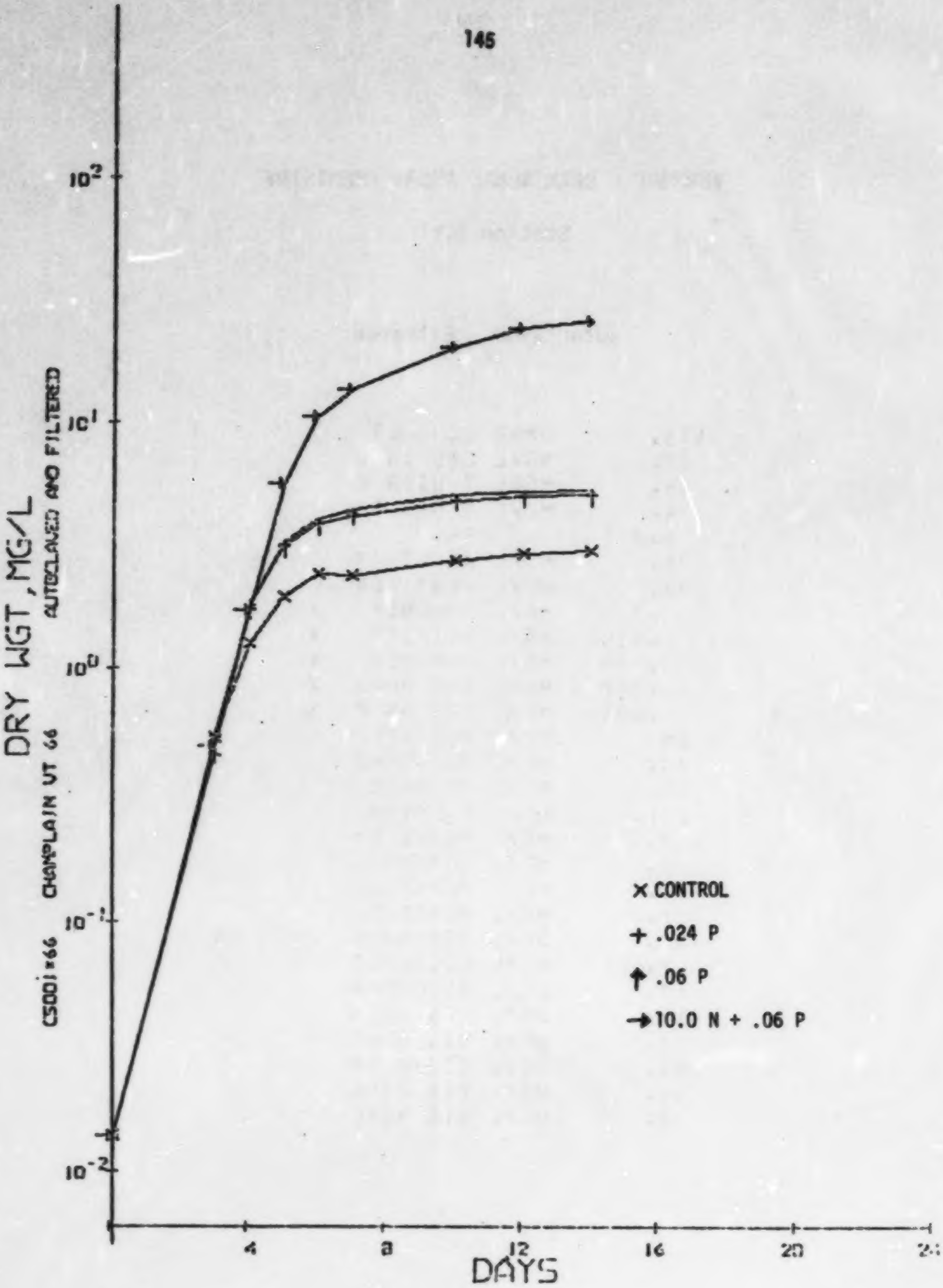
```
                          RAW            AUTOCLAVED
                        7150002            7150102
                        5001-78R           5001-78A

CONDUCT   UMHO          138.000            108.000
PH                        8.200              7.100
ALKLINTY  MG/L           41.000             26.000
HCO3 ALK  MG/L           41.000             26.000
AMMONIA   MG/L    A        .063               .069
NITRITE   MG/L    A        .001               .001
NITRATE   MG/L    A        .140               .110
SOL KJEL  MG/L            1.300       A       .290
KJELNIT   MG/L             .400
NO2+NO3   MG/L                                .117
TOT PHOS  MG/L             .016
DIS PHOS  MG/L             .006               .009
ORT AS P  MG/L             .005               .006
TOT HARD  MG/L           56.000             35.000
CALCIUM   MG/L           16.700              9.300
MAGNSIUM  MG/L            4.900              3.400
SODIUM    MG/L            5.200              4.000
CHLORIDE  MG/L            8.000              6.000
SULFATE   MG/L           22.000             16.000
TOT IRON  UG/L           80.000
DIS IRON  UG/L                        <     40.000
TOT MANG  UG/L           20.000
DIS MANG  UG/L                        <     20.000
REACT SI  MG/L             .170       A       .250
OIC TIC   MG/L            6.000
OIC DIC   MG/L                               4.000

     A - AVERAGED RESULT
```


DRY WGT, MG/L
CS001-78 CHAMPLAIN VT 78 AUTOCLAVED AND FILTERED
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ .006 P
→ .012 P


DRY WGT, MG/L
AUTOCLAVED AND FILTERED
C5001:70 CHAMPLAIN VT 70
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ .024 P
+ .06 P
+ 10.0 N + .06 P

```
ALGAL ASSAY CHEMISTRY SUMMARY FOR  LAKE CHAMPLAIN

                LAKE CODE 5001

                 SAMPLE # 66

                        RAW          AUTOCLAVED
                      7150003          7150103
                      5001-66R         5001-66A

CONDUCT  UMHO         108.000          124.000
PH                      8.600            7.400
ALKLINTY MG/L          29.000           30.000
HCO3 ALK MG/L          29.000           30.000
AMMONIA  MG/L            .040      A      .050
NITRITE  MG/L            .002      A      .002
NITRATE  MG/L            .100      A      .102
SOL KJEL MG/L            .750             .440
KJELNIT  MG/L            .400
NO2+NO3  MG/L            .104
TOT PHOS MG/L            .026
DIS PHOS MG/L            .014             .020
ORT AS P MG/L            .009      A      .015
TOT HARD MG/L          42.000           42.000
CALCIUM  MG/L          12.700           12.700
MAGNSIUM MG/L           3.500            3.000
SODIUM   MG/L           4.000            3.900
CHLORIDE MG/L           8.000            6.000
SULFATE  MG/L          17.000           17.000
TOT IRON UG/L     <    40.000
DIS IRON UG/L                      <    40.000
TOT MANG UG/L     <    20.000
DIS MANG UG/L                      <    20.000
REACT SI MG/L            .630             .720
DIC TIC  MG/L           4.000
DIC DIC  MG/L                            5.000

      A - AVERAGED RESULT
```


DRY WGT, MG/L
AUTOCLAVED AND FILTERED
CHAMPLAIN VT 66
CS001*66
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
× CONTROL
+ 10.0 N
↑ .006 P
→ .012 P

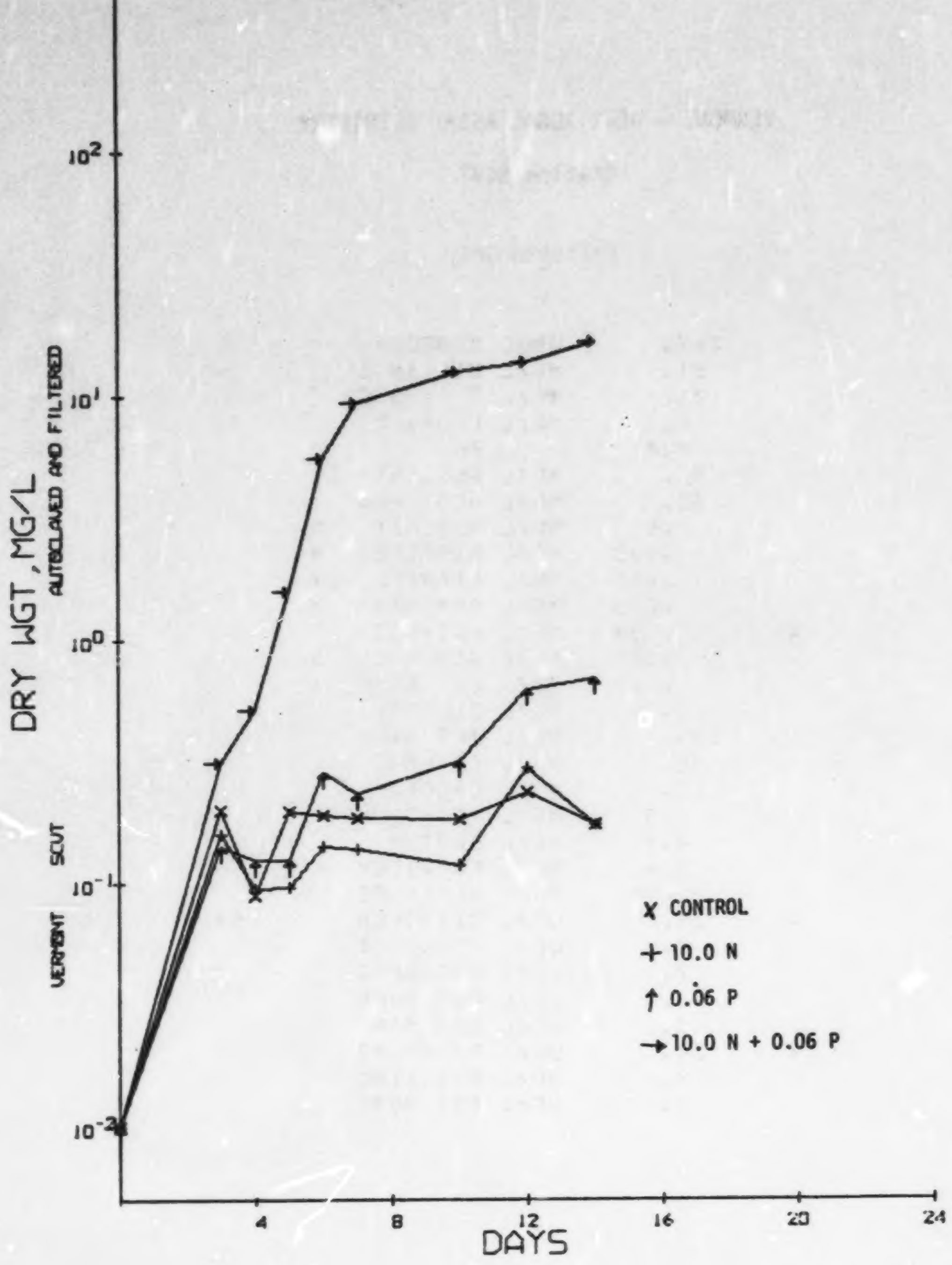

DRY WGT, MG/L
C500i=66 CHAMPLAIN VT 66 AUTOCLAVED AND FILTERED
10²
10¹
10⁰
10⁻¹
10⁻²
4
8
12
16
20
24
DAYS
× CONTROL
+ .024 P
↑ .06 P
→ 10.0 N + .06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station SCVT

Autoclaved - Filtered

```
   179.        UMHO CONDUCT
    20.        MG/L DIS IN C
    24.        MG/L T DISS C
     4.        MG/L D ORG C
     6.3            PH
    51.        MG/L ALKLINTY
    51.        MG/L HCO3 ALK
      .3       MG/L KJELNIT    X
      .004     MG/L NITRITE    X
      .034     MG/L AMMONIA    X
      .007     MG/L DIS PHOS   X
<     .001     MG/L ORT AS P   X
    18.        MG/L SULFATE
    73.        MG/L TOT HARD
    51.        MG/L CA HARD
    19.        MG/L CALCIUM
     5.2       MG/L MAGNSIUM
     5.        MG/L SODIUM
     1.7       MG/L POTASIUM
     1.2       MG/L REACT SI
<   25.        UG/L DISBORON          58
     2.        UG/L DISCOBLT
    17.        UG/L DISCOPPR
    18.        UG/L DIS IRON
     3.        UG/L DIS MANG
<   10.        UG/L DISMOLYB
    12.        UG/L DIS ZINC
     3.        UG/L DIS MERC
```

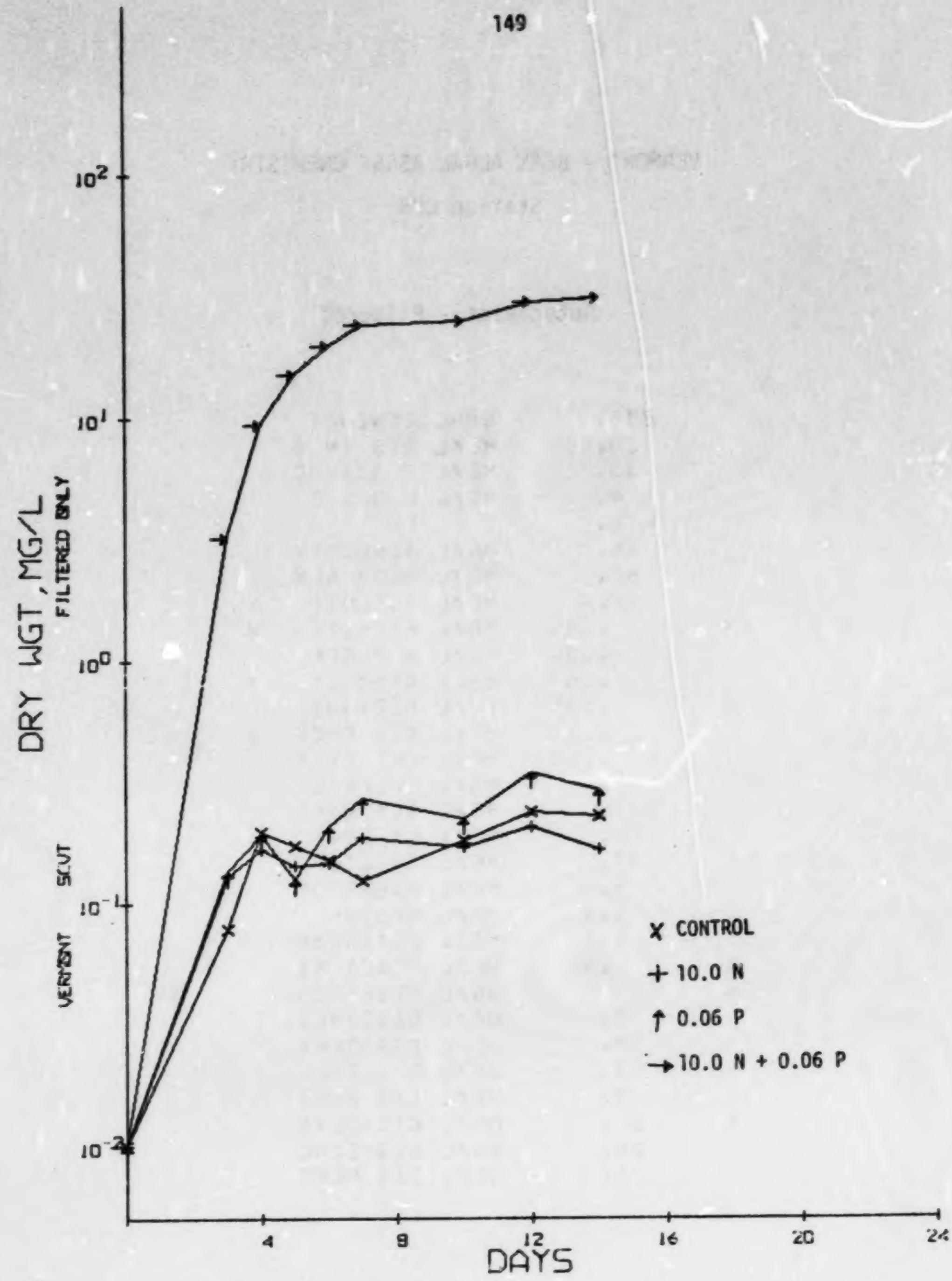

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT SCUT
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station SCVT

Filtered Only

```
         247.       UMHO CONDUCT
          21.       MG/L DIS IN C
          25.       MG/L T DISS C
           4.       MG/L C ORG C
           7.8           PH
          92.       MG/L ALKLINTY
          92.       MG/L HCO3 ALK
            .6      MG/L KJELNIT    X
            .002    MG/L NITRITE    X
            .005    MG/L NITRATE    X
            .009    MG/L AMMONIA    X
A           .064    MG/L NO2+NO3
            .005    MG/L DIS PHOS   X
            .002    MG/L ORT AS P   X
          23.       MG/L SULFATE
         135.       MG/L TOT HARD
          56.       MG/L CA HARD
          32.       MG/L CALCIUM
           6.3      MG/L MAGNSIUM
           4.8      MG/L SODIUM
           1.4      MG/L POTASIUM
            .09     MG/L REACT SI
<         25.       UG/L DISBORON          58
           2.       UG/L DISCOBLT
           7.       UG/L DISCOPPR
          49.       UG/L DIS IRON
           7.       UG/L DIS MANG
<         10.       UG/L DISMOLYB
           7.       UG/L DIS ZINC
           1.       UG/L DIS MERC
```

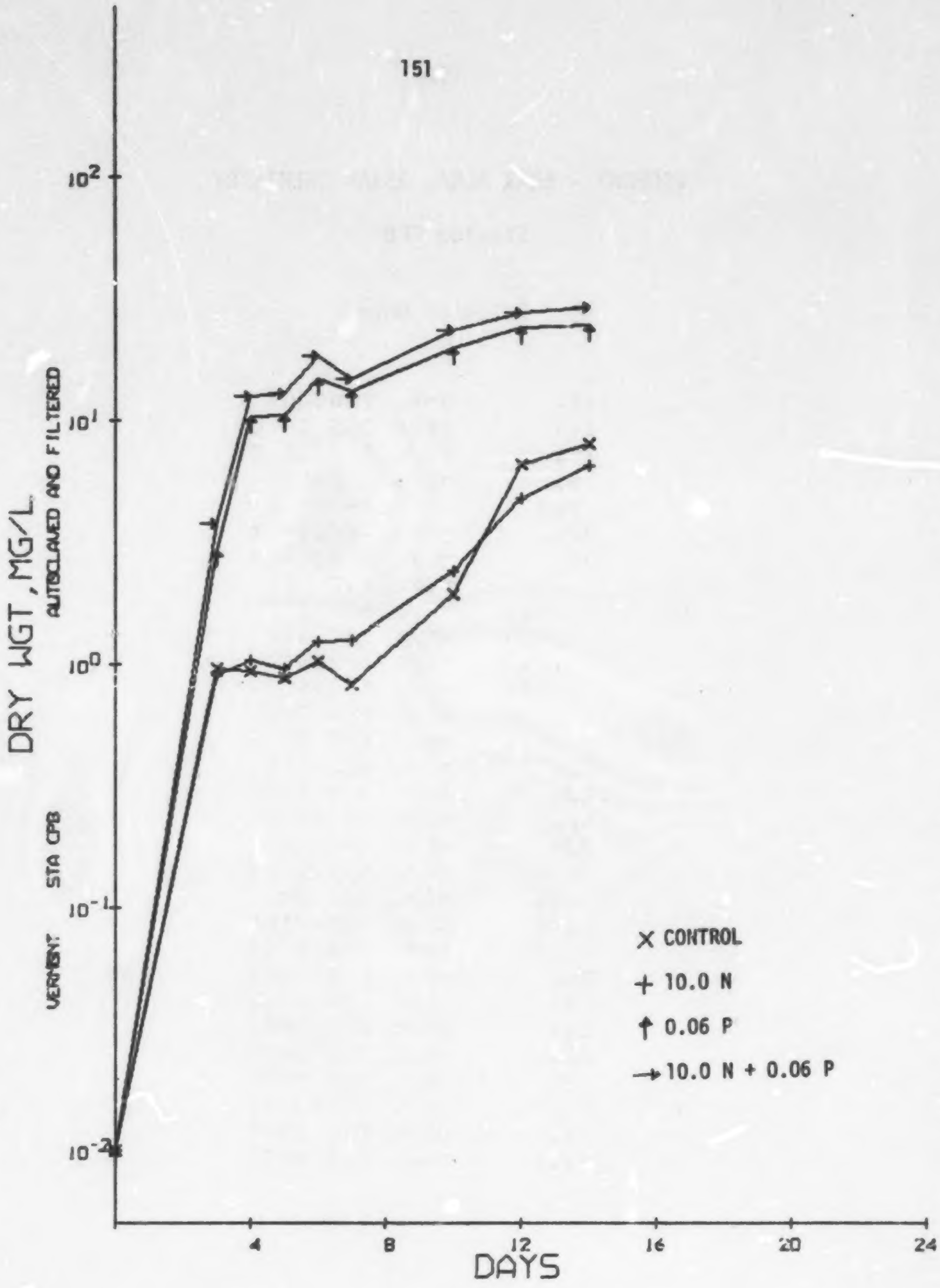

DRY WGT, MG/L
FILTERED ONLY
VERMONT SCUT
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station CPB

Autoclaved - Filtered

```
     236.      UMHO CONDUCT
      29.      MG/L DIS IN C
      33.      MG/L T DISS C
       4.      MG/L D ORG C
       6.5          PH
      86.      MG/L ALKLINTY
      86.      MG/L HCO3 ALK
        .4     MG/L KJELNIT   X
<       .001   MG/L NITRITE   X
        .004   MG/L NITRATE
        .065   MG/L AMMONIA   X
A       .005   MG/L NO2+NO3
        .015   MG/L DIS PHOS  X
        .011   MG/L ORT AS P
      13.      MG/L SULFATE
     109.      MG/L TOT HARD
      76.      MG/L CA HARD
      32.      MG/L CALCIUM
       5.8     MG/L MAGNSIUM
       4.8     MG/L SODIUM
       1.5     MG/L POTASIUM
A       .94    MG/L REACT SI
<     25.      UG/L DISBORON        58
       2.      UG/L DISCOBLT
      18.      UG/L DISCOPPR
      52.      UG/L DIS IRON
       3.      UG/L DIS MANG
<     10.      UG/L DISMOLYB
      14.      UG/L DIS ZINC
       1.      UG/L DIS MERC
```

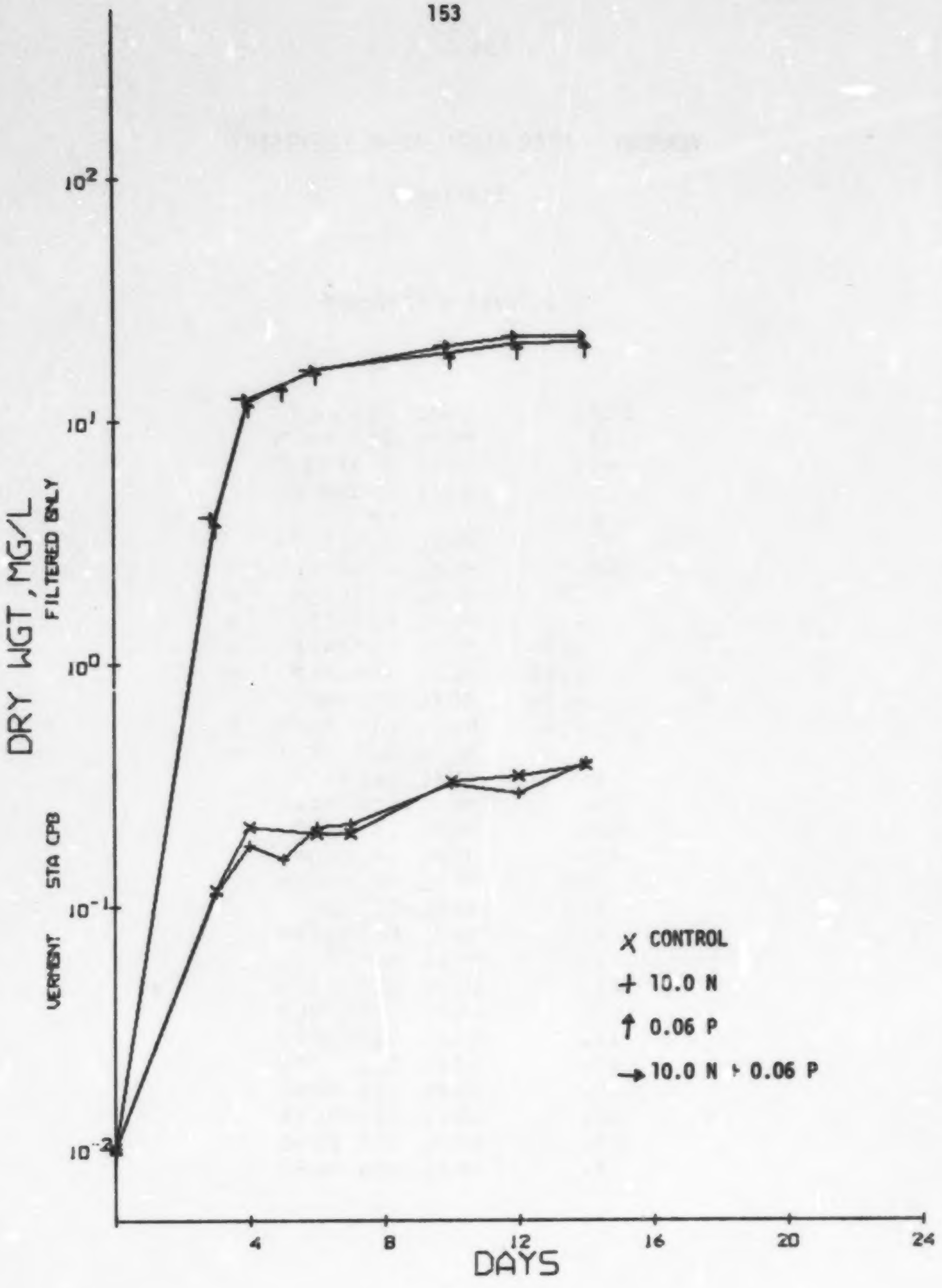

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT STA CPB
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
× CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station CPB

Filtered Only

```
          247.        UMHO CONDUCT
           21.        MG/L DIS IN C
           25.        MG/L T DISS C
            4.        MG/L D ORG C
            7.9            PH
           92.        MG/L ALKLINTY
           92.        MG/L HCO3 ALK
             .2       MG/L KJELNIT
<            .001     MG/L NITRITE    X
             .009     MG/L NITRATE    X
             .013     MG/L AMMONIA    X
A            .009     MG/L NO2+NO3
             .006     MG/L DIS PHOS   X
             .001     MG/L ORT AS P   X
           17.        MG/L SULFATE
          113.        MG/L TOT HARD
           42.        MG/L CA HARD
           33.        MG/L CALCIUM
            6.2       MG/L MAGNSIUM
            4.8       MG/L SODIUM
            1.5       MG/L POTASIUM
             .05      MG/L REACT SI
<          25.        UG/L DISBORON           59
            2.        UG/L DISCOBLT
           11.        UG/L DISCOPPR
           52.        UG/L DIS IRON
            2.        UG/L DIS MANG
<          10.        UG/L DISMOLYB
            9.        UG/L DIS ZINC
            1.5       UG/L DIS MERC
```

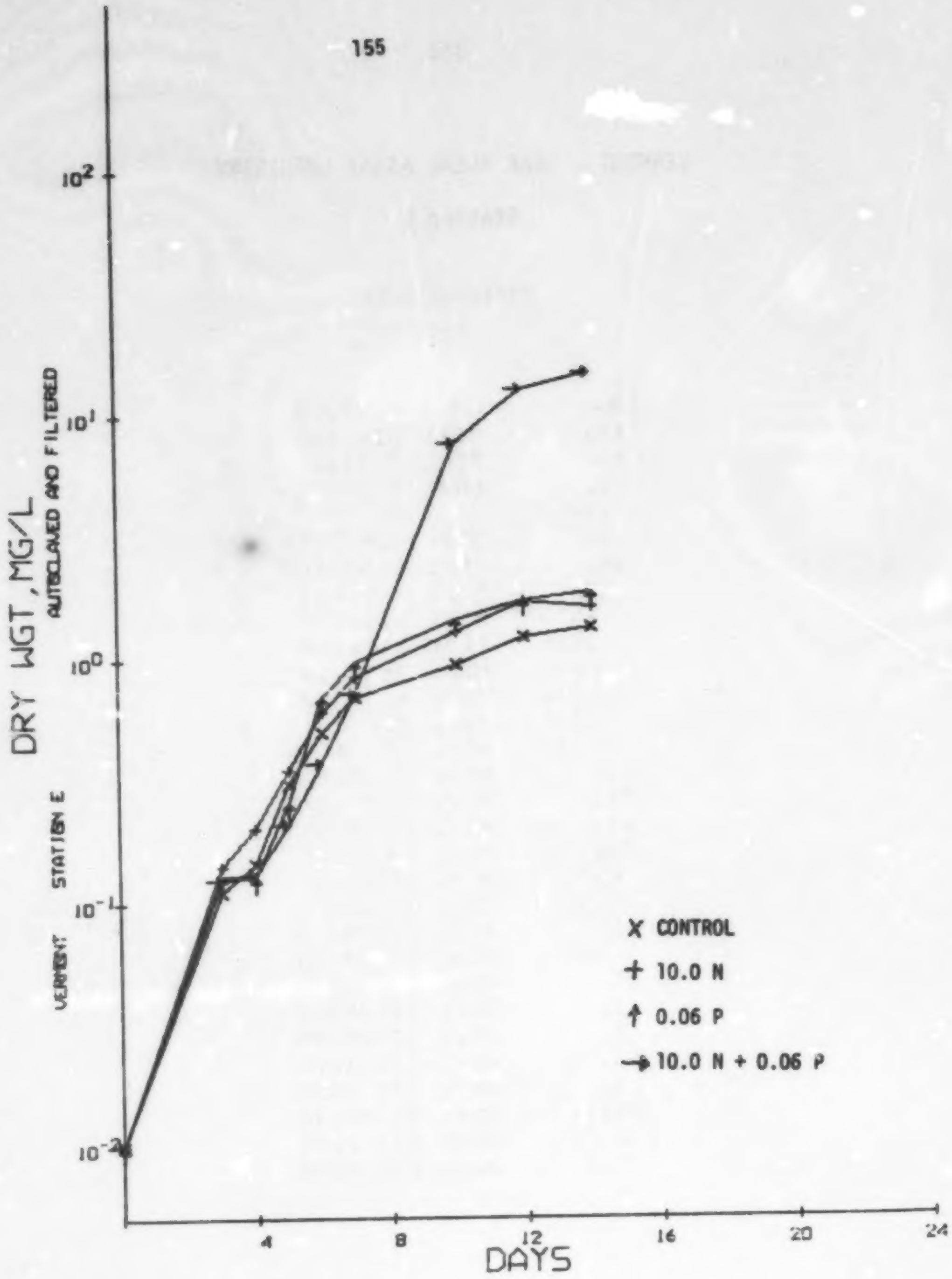

DRY WGT, MG/L
FILTERED ONLY
VERMONT STA CPB
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station E

Autoclaved - Filtered

```
           197.        UMHO CONDUCT
            36.        MG/L DIS IN C
            41.        MG/L T DISS C
             5.        MG/L D ORG C
             6.             PH
            62.        MG/L ALKLINTY
            62.        MG/L HCO3 ALK
              .2       MG/L KJELNIT    X
              .005     MG/L NITRITE    X
              .034     MG/L NITRATE    X
              .085     MG/L AMMONIA    X
A             .034     MG/L NO2+NO3
              .04      MG/L DIS PHOS   X
              .039     MG/L ORT AS P   X
            16.        MG/L SULFATE
            78.        MG/L TOT HARD
            68.        MG/L CA HARD
            23.        MG/L CALCIUM
             4.3       MG/L MAGNSIUM
             6.1       MG/L SODIUM
             1.2       MG/L POTASIUM
             1.32      MG/L REACT SI
<           25.        UG/L DISBORON          58
             2.        UG/L DISCOBLT
            10.        UG/L DISCOPPR
            49.        UG/L DIS IRON
             5.        UG/L DIS MANG
<           10.        UG/L DISMOLYB
            19.        UG/L DIS ZINC
             1.        UG/L DIS MERC
```

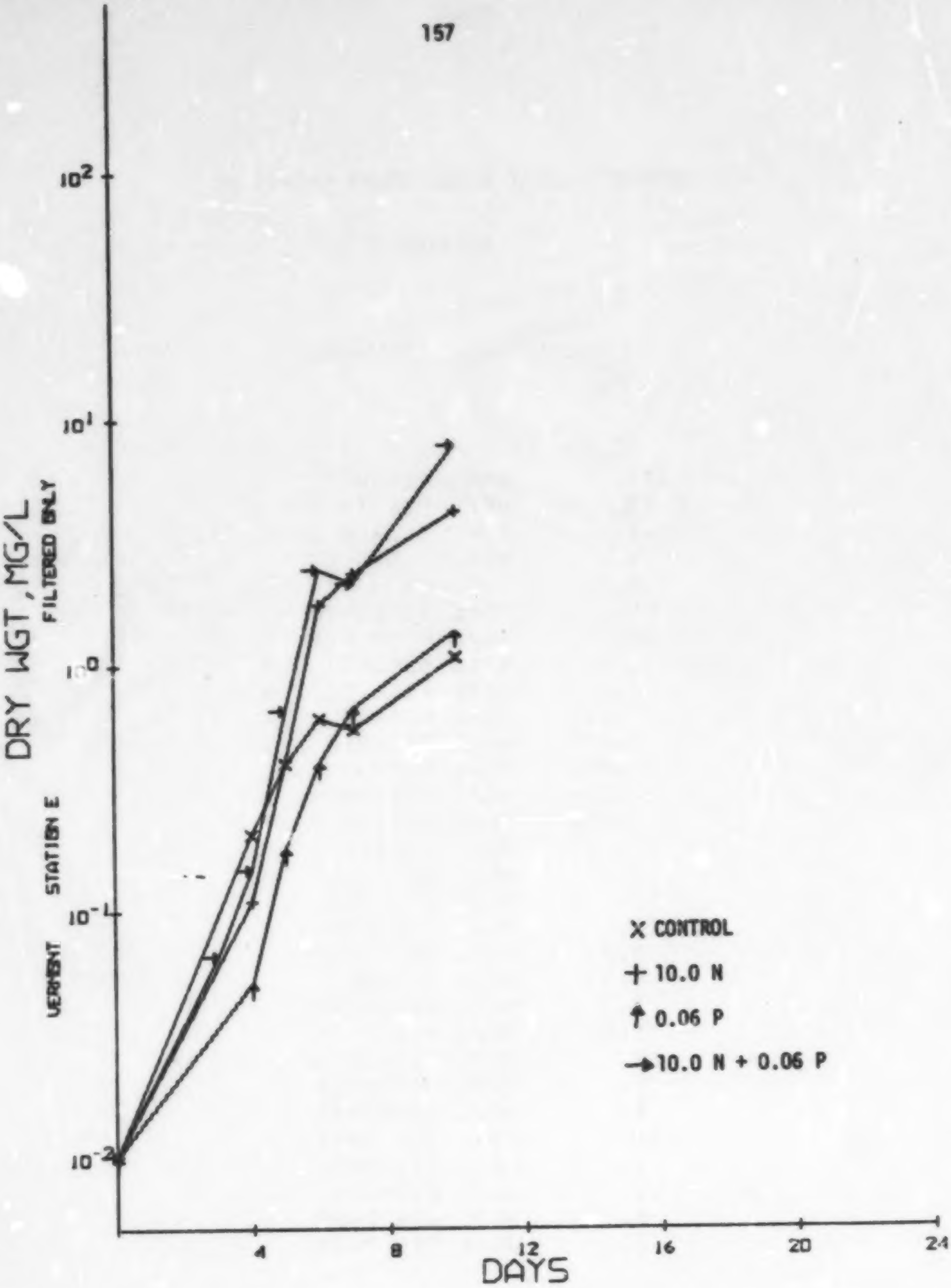

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT STATION E
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station E

Filtered Only

```
        194.      UMHO CONDUCT
         14.      MG/L DIS IN C
         19.      MG/L T DISS C
          5.      MG/L D ORG C
          7.7          PH
         66.      MG/L ALKLINTY
         66.      MG/L HCO3 ALK
           .4     MG/L KJELNIT    X
           .005   MG/L NITRITE    X
           .028   MG/L NITRATE    X
           .046   MG/L AMMONIA    X
A          .028   MG/L NO2+NO3
           .016   MG/L DIS PHOS   X
A          .007   MG/L ORT AS P
         13.      MG/L SULFATE
         71.      MG/L TOT HARD
         61.      MG/L CA HARD
         24.      MG/L CALCIUM
          4.3     MG/L MAGNSIUM
          6.1     MG/L SODIUM
          1.      MG/L POTASIUM
A          .97    MG/L REACT SI
<        25.      UG/L DISBORON           59
          2.      UG/L DISCOBLT
          5.      UG/L DISCOPPR
         89.      UG/L DIS IRON
<         1.      UG/L DIS MANG
<        10.      UG/L DISMOLYB
          8.      UG/L DIS ZINC
          1.5     UG/L DIS MERC
```

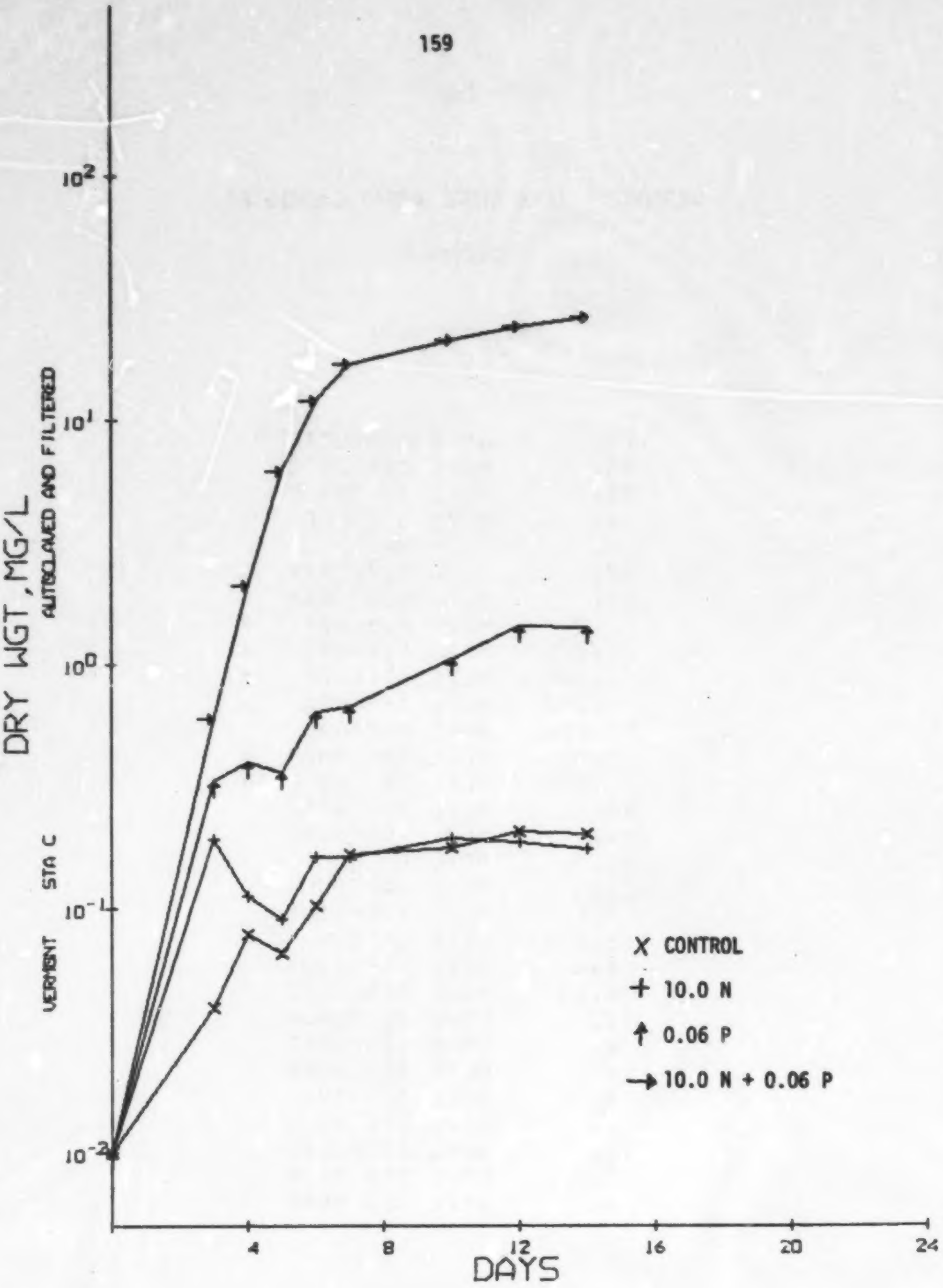

DRY WGT, MG/L
FILTERED ONLY
VERMONT STATION E
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
0.06 P
10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station C

Autoclaved - Filtered

```
        173.       UMHO CONDUCT
         13.       MG/L DIS IN C
         17.       MG/L T DISS C
          4.       MG/L D ORG C
          7.4           PH
         59.       MG/L ALKLINTY
         59.       MG/L HCO3 ALK
           .2      MG/L KJELNIT    X
           .006    MG/L NITRITE    X
           .052    MG/L NITRATE    X
           .094    MG/L AMMONIA    X
A          .051    MG/L NO2+NO3
           .038    MG/L DIS PHOS   X
           .066    MG/L ORT AS P   X
         15.       MG/L SULFATE
         72.       MG/L TOT HARD
         52.       MG/L CA HARD
         21.       MG/L CALCIUM
          3.8      MG/L MAGNSIUM
          5.7      MG/L SODIUM
          1.       MG/L POTASIUM
          1.5      MG/L REACT SI
<        25.       UG/L DISBORON          58
          2.       UG/L DISCOBLT
          6.       UG/L DISCOPPR
        111.       UG/L DIS IRON
          1.       UG/L DIS MANG
<        10.       UG/L DISMOLYB
          8.       UG/L DIS ZINC
          3.       UG/L DIS MERC
```

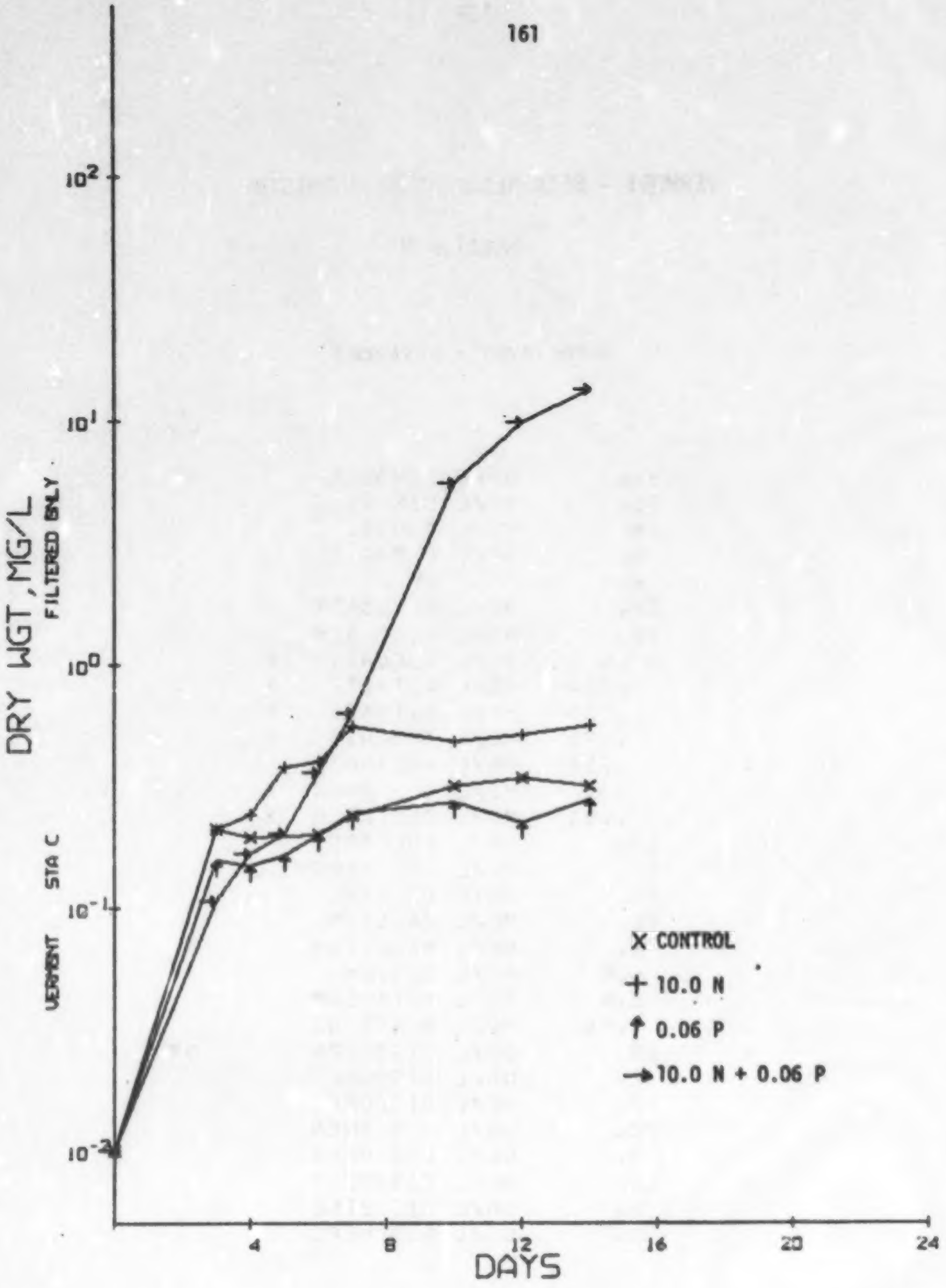

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT STA C
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station C

Filtered Only

```
       179.       UMHO CONDUCT
        29.       MG/L DIS IN C
        33.       MG/L T DISS C
         4.       MG/L D ORG C
         6.            PH
        53.       MG/L ALKLINTY
        53.       MG/L HCO3 ALK
          .2      MG/L KJELNIT    X
          .006    MG/L NITRITE    X
          .056    MG/L NITRATE    X
          .067    MG/L AMMONIA    X
A         .056    MG/L NO2+NO3
          .015    MG/L DIS PHOS   X
          .018    MG/L ORT AS P   X
        19.       MG/L SULFATE
        84.       MG/L TOT HARD
        52.       MG/L CA HARD
        22.       MG/L CALCIUM
         3.4      MG/L MAGNSIUM
         6.2      MG/L SODIUM
         1.1      MG/L POTASIUM
         1.68     MG/L REACT SI
 <      25.       UG/L DISBORON          58
         2.       UG/L DISCOBLT
         5.       UG/L DISCOPPR
        18.       UG/L DIS IRON
 <       1.       UG/L DIS MANG
 <      10.       UG/L DISMOLYB
         3.       UG/L DIS ZINC
         1.       UG/L DIS MERC
```

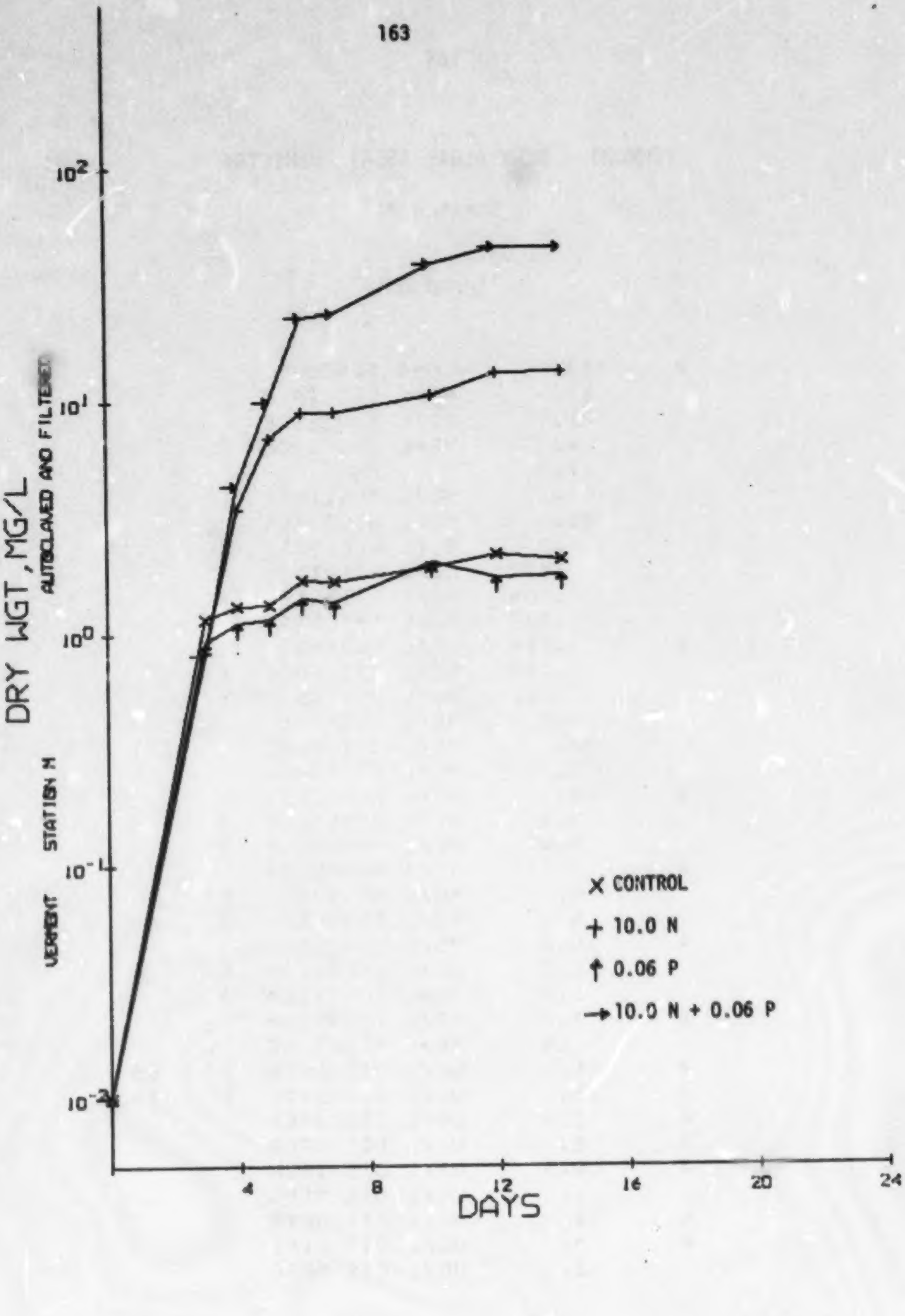

DRY WGT, MG/L
FILTERED ONLY
VERMONT STA C
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station M

Autoclaved - Filtered

```
        184.        UMHO CONDUCT
         21.        MG/L DIS IN C
         25.        MG/L T DISS C
          4.        MG/L D ORG C
          6.3            PH
         56.        MG/L ALKLINTY
         56.        MG/L HCO3 ALK
           .4       MG/L KJELNIT    X
           .004     MG/L NITRITE    X
           .019     MG/L NITRATE    X
           .076     MG/L AMMONIA    X
A          .016     MG/L NO2+NO3
           .01      MG/L DIS PHOS   X
           .009     MG/L ORT AS P   X
         19.        MG/L SULFATE
         71.        MG/L TOT HARD
         56.        MG/L CA HARD
         21.        MG/L CALCIUM
          5.        MG/L MAGNSIUM
          5.5       MG/L SODIUM
          1.4       MG/L POTASIUM
           .95      MG/L REACT SI
<        25.        UG/L DISBORON           58
          2.        UG/L DISCOBLT
          7.        UG/L DISCOPPR
         22.        UG/L DIS IRON
          3.        UG/L DIS MANG
<        10.        UG/L DISMOLYB
          8.        UG/L DIS ZINC
          1.        UG/L DIS MERC
```

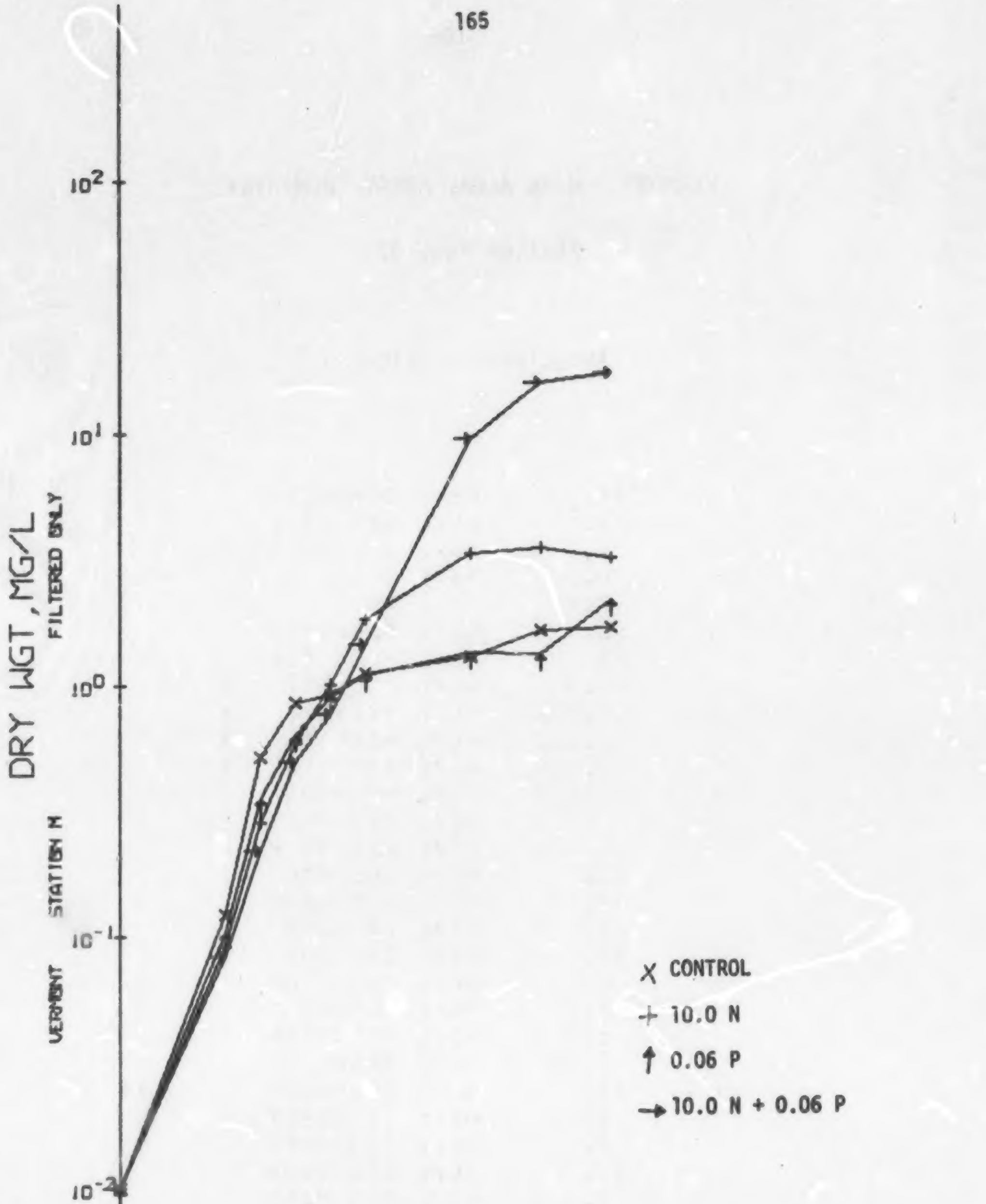

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT STATION M
10²
10¹
10⁰
10⁻¹
10⁻²
4
8
12
16
20
24
DAYS
× CONTROL
+ 10.0 N
† 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station M

Filtered Only

```
A     222.       UMHO CONDUCT
       18.       MG/L DIS IN C
       22.       MG/L T DISS C
        4.       MG/L D ORG C
        7.7           PH
       81.       MG/L ALKLINTY
       81.       MG/L HCO3 ALK
         .2      MG/L KJELNIT    X
         .003    MG/L NITRITE    X
         .014    MG/L NITRATE    X
         .035    MG/L AMMONIA    X
A        .014    MG/L NO2+NO3
         .017    MG/L DIS PHOS   X
         .012    MG/L ORT AS P   X
       17.       MG/L SULFATE
       92.       MG/L TOT HARD
       75.       MG/L CA HARD
A      30.       MG/L CALCIUM
        5.4      MG/L MAGNSIUM   3
        5.4      MG/L MAGNSIUM   3
A       5.4      MG/L MAGNSIUM
        5.2      MG/L SODIUM     3
        5.2      MG/L SODIUM     3
A       5.2      MG/L SODIUM
        1.2      MG/L POTASIUM   3
        1.2      MG/L POTASIUM   3
A       1.2      MG/L POTASIUM
         .4      MG/L REACT SI
<      25.       UG/L DISBORON   3     58
<      25.       UG/L DISBORON   3     58
A       2.5      UG/L DISCOBLT
A       6.       UG/L DISCOPPR
A      64.5      UG/L DIS IRON
        1.       UG/L DIS MANG
<      10.       UG/L DISMOLYB
A       8.       UG/L DIS ZINC
        2.       UG/L DIS MERC
```

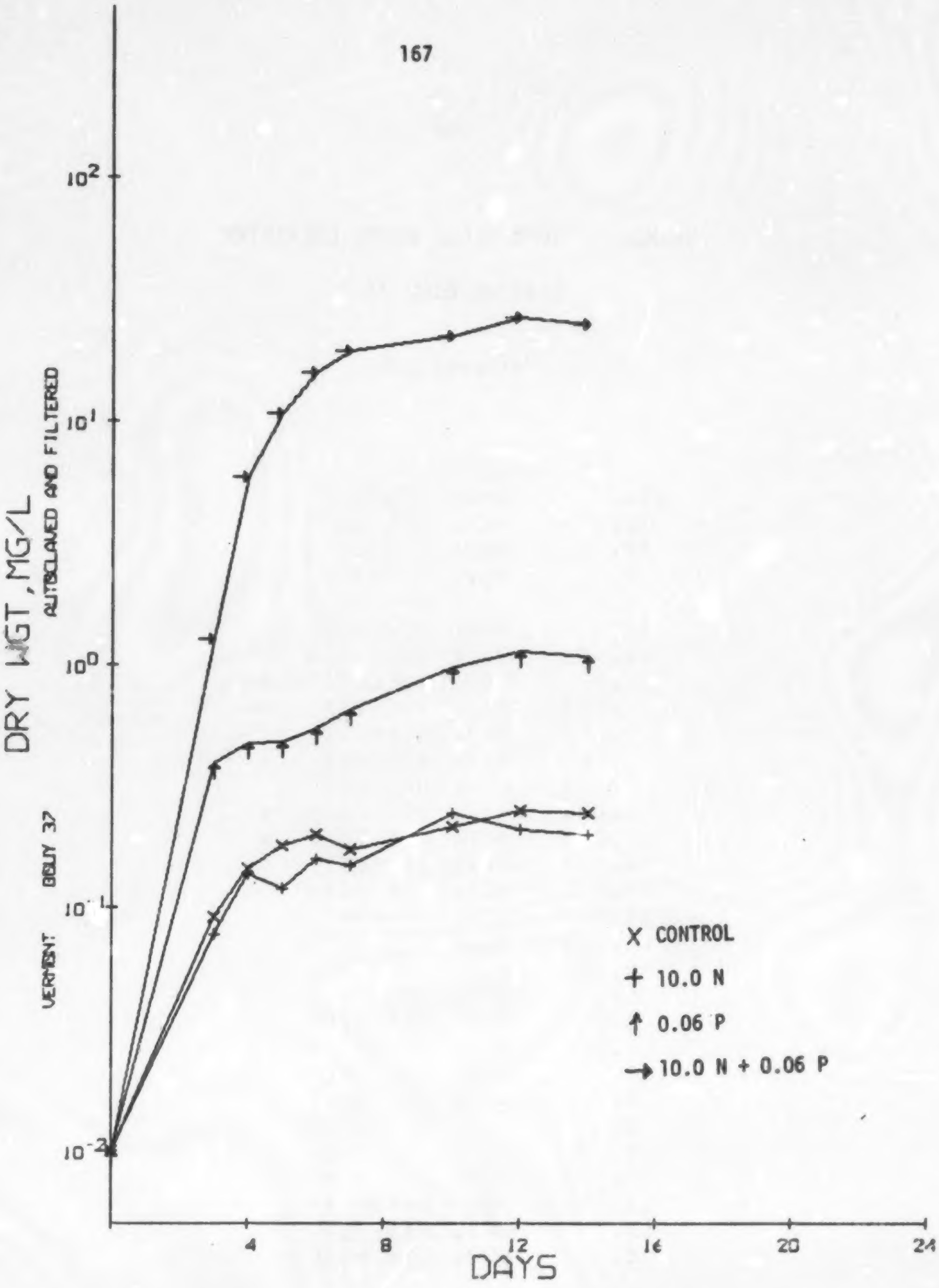

DRY WGT, MG/L
FILTERED ONLY
VERMONT STATION M
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station Buoy 37

Autoclaved - Filtered

```
      236.      UMHO CONDUCT
       20.      MG/L DIS IN C
       24.      MG/L T DISS C
        4.      MG/L D ORG C
        7.7          PH
       82.      MG/L ALKLINTY
       82.      MG/L HCO3 ALK
         .3     MG/L KJELNIT    X
         .002   MG/L NITRITE    X
         .011   MG/L NITRATE    X
         .016   MG/L AMMONIA    X
A        .003   MG/L NO2+NO3
         .008   MG/L DIS PHOS   X
         .009   MG/L ORT AS P   X
       18.      MG/L SULFATE
       98.      MG/L TOT HARD
       61.      MG/L CA HARD
       32.      MG/L CALCIUM
        6.      MG/L MAGNSIUM
        6.2     MG/L SODIUM
        1.7     MG/L POTASIUM
        1.05    MG/L REACT SI
<      25.      UG/L DISBORON          58
        2.      UG/L DISCOBLT
        7.      UG/L DISCOPPR
       52.      UG/L DIS IRON
        2.      UG/L DIS MANG
<      10.      UG/L DISMOLYB
        6.      UG/L DIS ZINC
        2.      UG/L DIS MERC
```

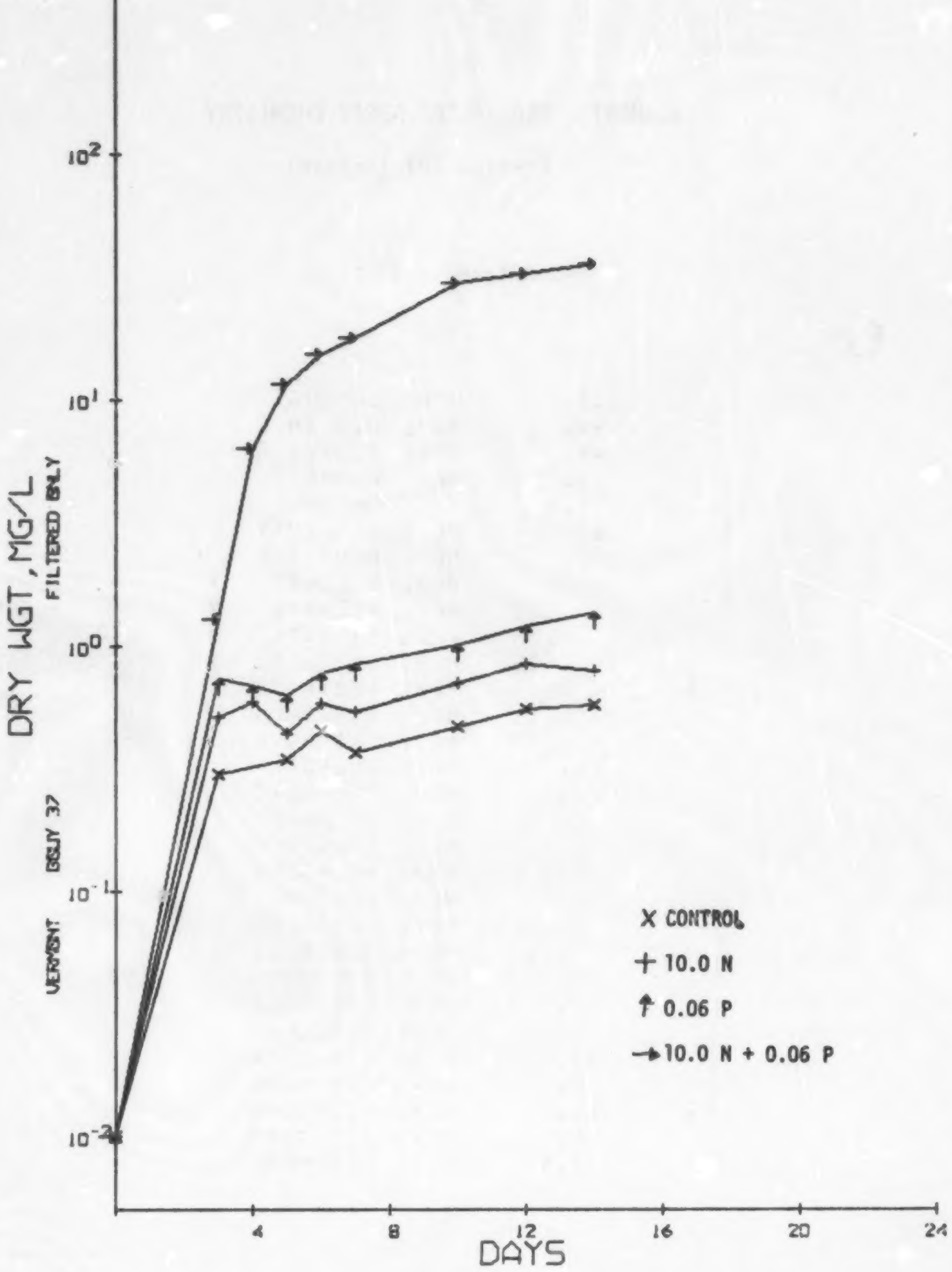

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT BBUY 37
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station Bouy 37

Filtered Only

```
        184.       UMHO CONDUCT
         31.       MG/L DIS IN C
         37.       MG/L T DISS C
          6.       MG/L D ORG C
          6.            PH
         50.       MG/L ALKLINTY
         50.       MG/L HCO3 ALK
           .3      MG/L KJELNIT    X
           .002    MG/L NITRITE    X
           .012    MG/L NITRATE    X
           .056    MG/L AMMONIA    X
A          .009    MG/L NO2+NO3
           .006    MG/L DIS PHOS   X
           .003    MG/L ORT AS P   X
         19.       MG/L SULFATE
         67.       MG/L TOT HARD
         52.       MG/L CA HARD
         19.       MG/L CALCIUM
          5.2      MG/L MAGNSIUM
          5.9      MG/L SODIUM
          1.6      MG/L POTASIUM
A          .94     MG/L REACT SI
<        25.       UG/L DISBORON          58
          2.       UG/L DISCOBLT
          6.       UG/L DISCOPPR
         21.       UG/L DIS IRON
          3.       UG/L DIS MANG
<        10.       UG/L DISMOLYB
         10.       UG/L DIS ZINC
          1.       UG/L DIS MERC
```

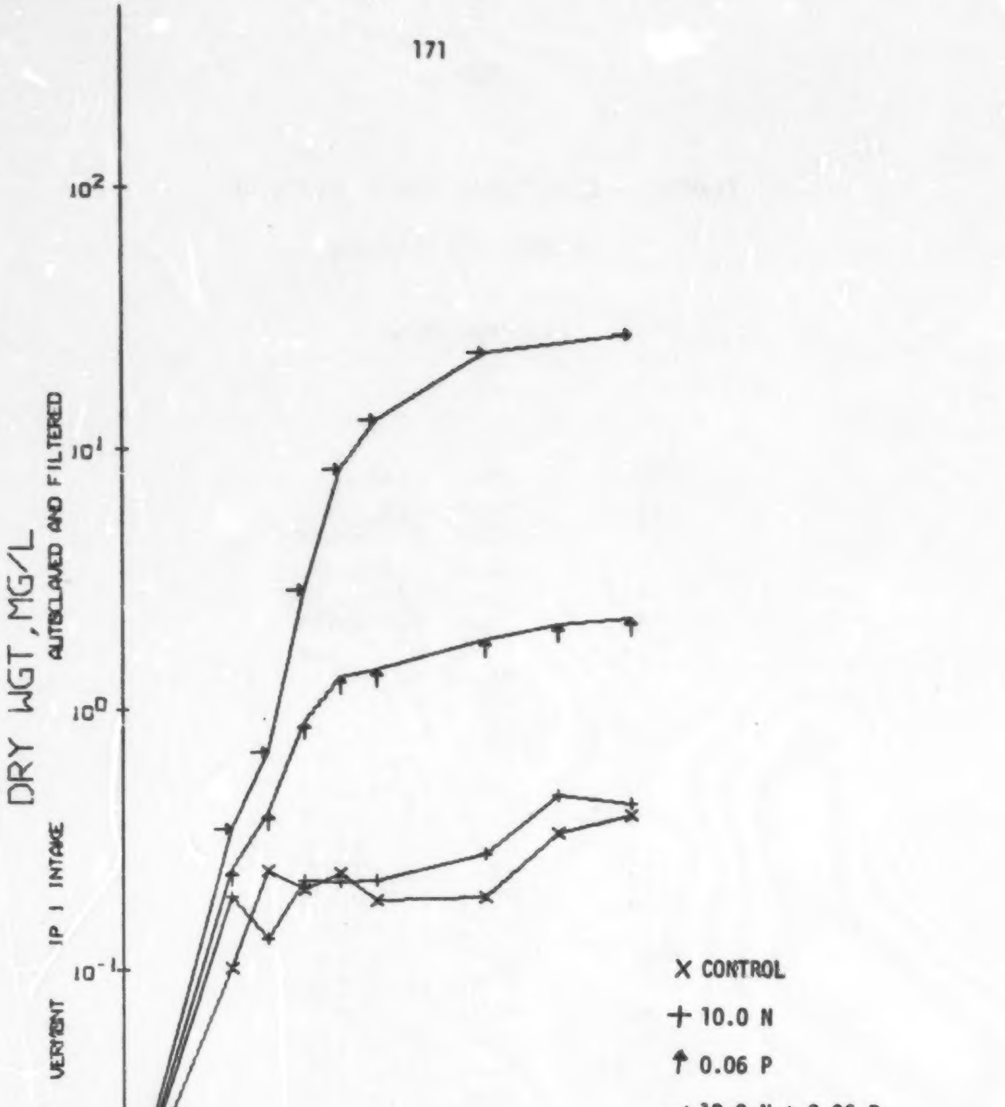

DRY WGT, MG/L
FILTERED ONLY
VERMONT 05JY 37
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station IP1 (intake)

Autoclaved - Filtered

```
     200.      UMHO CONDUCT
      44.      MG/L DIS IN C
      48.      MG/L T DISS C
       4.      MG/L D ORG C
       5.8          PH
      55.      MG/L ALKLINTY
      55.      MG/L HCO3 ALK
        .4     MG/L KJELNIT    X
        .003   MG/L NITRITE    X
        .078   MG/L NITRATE    X
        .005   MG/L AMMONIA    X
A       .079   MG/L NO2+NO3
        .011   MG/L DIS PHOS   X
        .002   MG/L ORT AS P   X
      19.      MG/L SULFATE
      76.      MG/L TOT HARD
      60.      MG/L CA HARD
      22.      MG/L CALCIUM
       5.2     MG/L MAGNSIUM
       6.1     MG/L SODIUM
       1.4     MG/L POTASIUM
        .74    MG/L REACT SI
      25.      UG/L DISBORON            58
       2.      UG/L DISCOBLT
       8.      UG/L DISCOPPR
      23.      UG/L DIS IRON
       5.      UG/L DIS MANG
<     10.      UG/L DISMOLYB
       6.      UG/L DIS ZINC
       3.5     UG/L DIS MERC
```

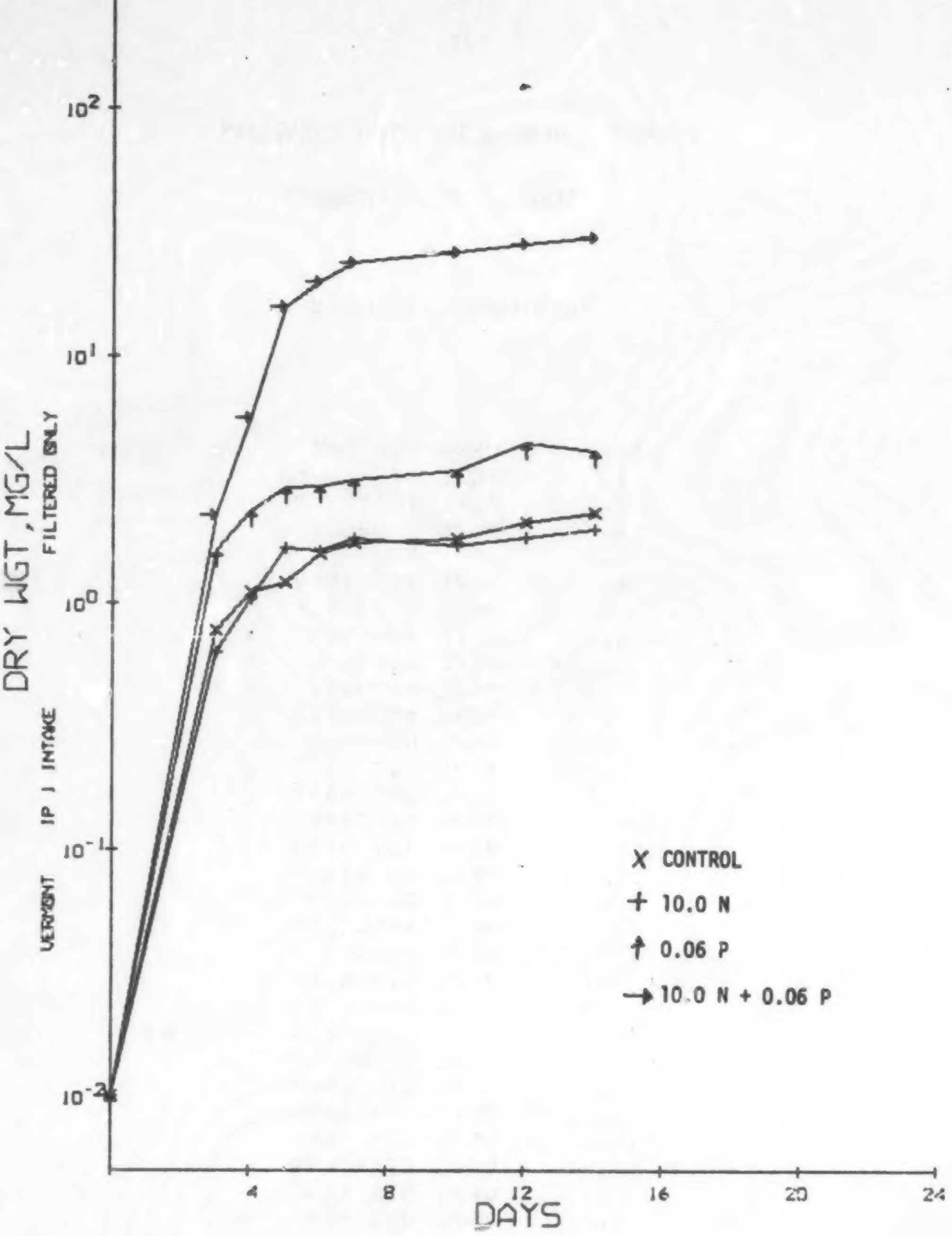

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT IP I INTAKE
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station IP1 (intake)

Filtered Only

```
        194.      UMHO CONDUCT
         12.      MG/L DIS IN C
         17.      MG/L T DISS C
          5.      MG/L D ORG C
          7.7          PH
         59.      MG/L ALKLINTY
         59.      MG/L HCO3 ALK
           .3     MG/L KJELNIT    X
           .002   MG/L NITRITE    X
           .026   MG/L NITRATE    X
           .021   MG/L AMMONIA    X
A          .026   MG/L NO2+NO3
           .004   MG/L DIS PHOS   X
           .002   MG/L ORT AS P   X
         19.      MG/L SULFATE
         76.      MG/L TOT HARD
         57.      MG/L CA HARD
         23.      MG/L CALCIUM
          5.      MG/L MAGNSIUM
          5.4     MG/L SODIUM
          1.1     MG/L POTASIUM
           .12    MG/L REACT SI
<        25.      UG/L DISBORON             59
          2.      UG/L DISCOBLT
          5.      UG/L DISCOPPR
         30.      UG/L DIS IRON
          4.      UG/L DIS MANG
<        10.      UG/L DISMOLYB
          5.      UG/L DIS ZINC
          1.      UG/L DIS MERC
```

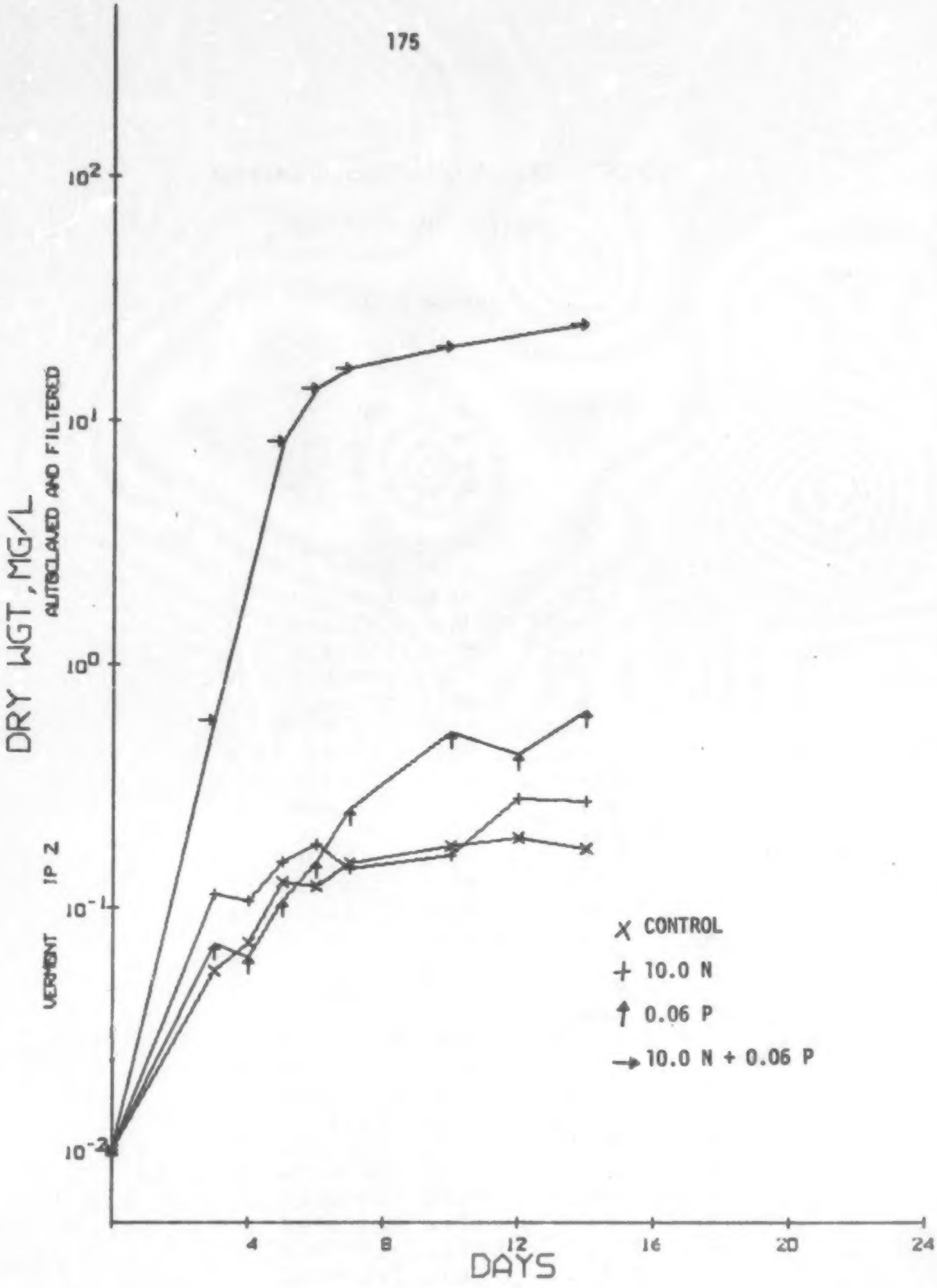

DRY WGT, MG/L
FILTERED ONLY
VERMONT IP I INTAKE
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
† 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station IP2 (effluent)

Autoclaved - Filtered

```
      630.       UMHO CONDUCT
<       1.       MG/L DIS IN C
       17.       MG/L T DISS C
       17.       MG/L D ORG C
        6.9           PH
        6.       MG/L ALKLINTY
        6.       MG/L HCO3 ALK
        2.5      MG/L KJELNIT    X
         .004    MG/L NITRITE    X
         .006    MG/L NITRATE    X
         .72     MG/L AMMONIA    X
A        .006    MG/L NO2+NO3
         .062    MG/L DIS PHOS   X
         .044    MG/L ORT AS P   X
      142.       MG/L SULFATE
      120.       MG/L TOT HARD
       90.       MG/L CA HARD
       42.       MG/L CALCIUM
        3.4      MG/L MAGNSIUM
       70.       MG/L SODIUM
        2.7      MG/L POTASIUM
         .34     MG/L REACT SI
<      25.       UG/L DISBORON          58
        3.       UG/L DISCOBLT
        7.       UG/L DISCOPPR
       61.       UG/L DIS IRON
      245.       UG/L DIS MANG
<      10.       UG/L DISMOLYB
        7.       UG/L DIS ZINC
A       1.       UG/L DIS MERC
```

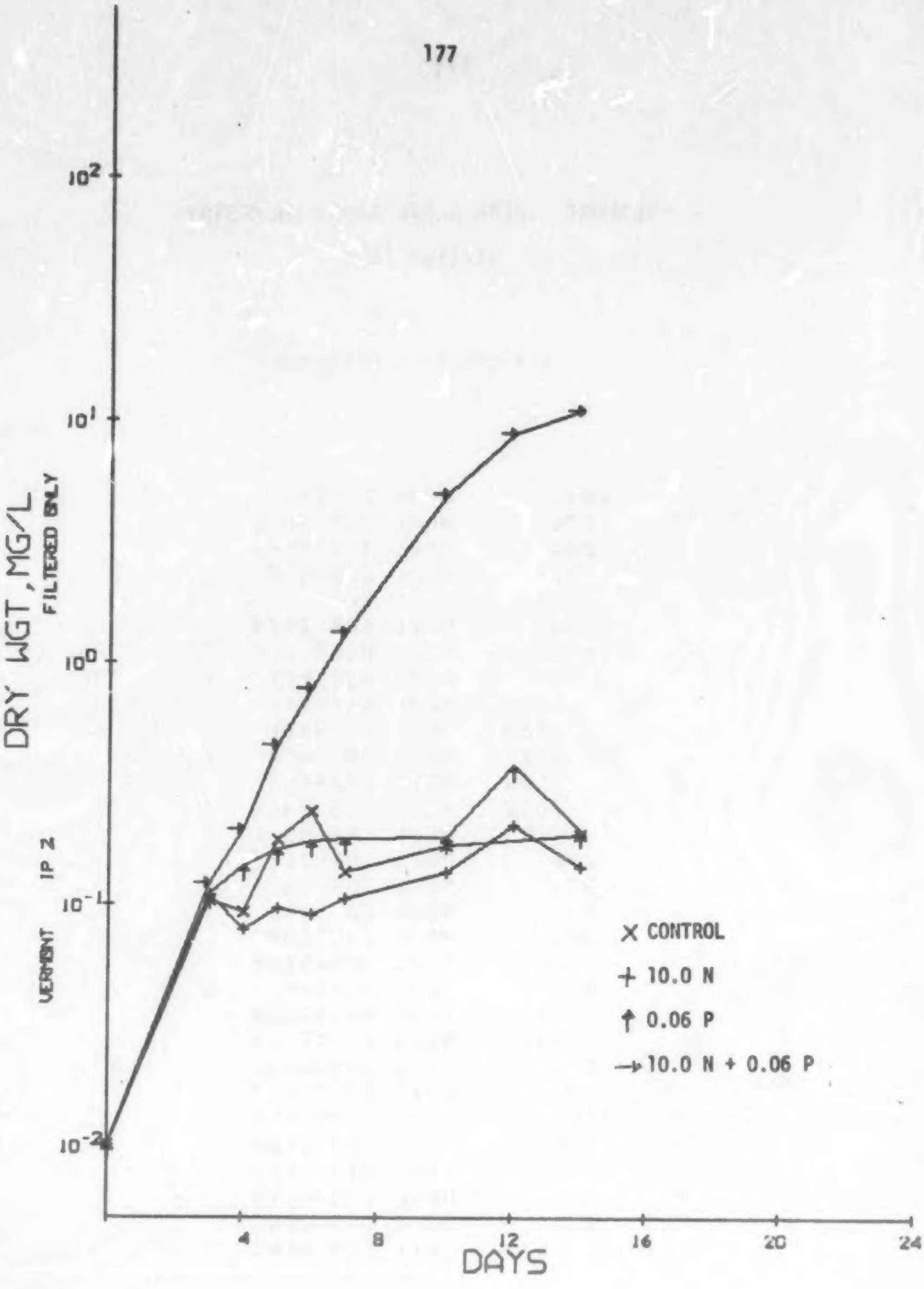

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT IP 2
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station IP2 (effluent)

Filtered Only

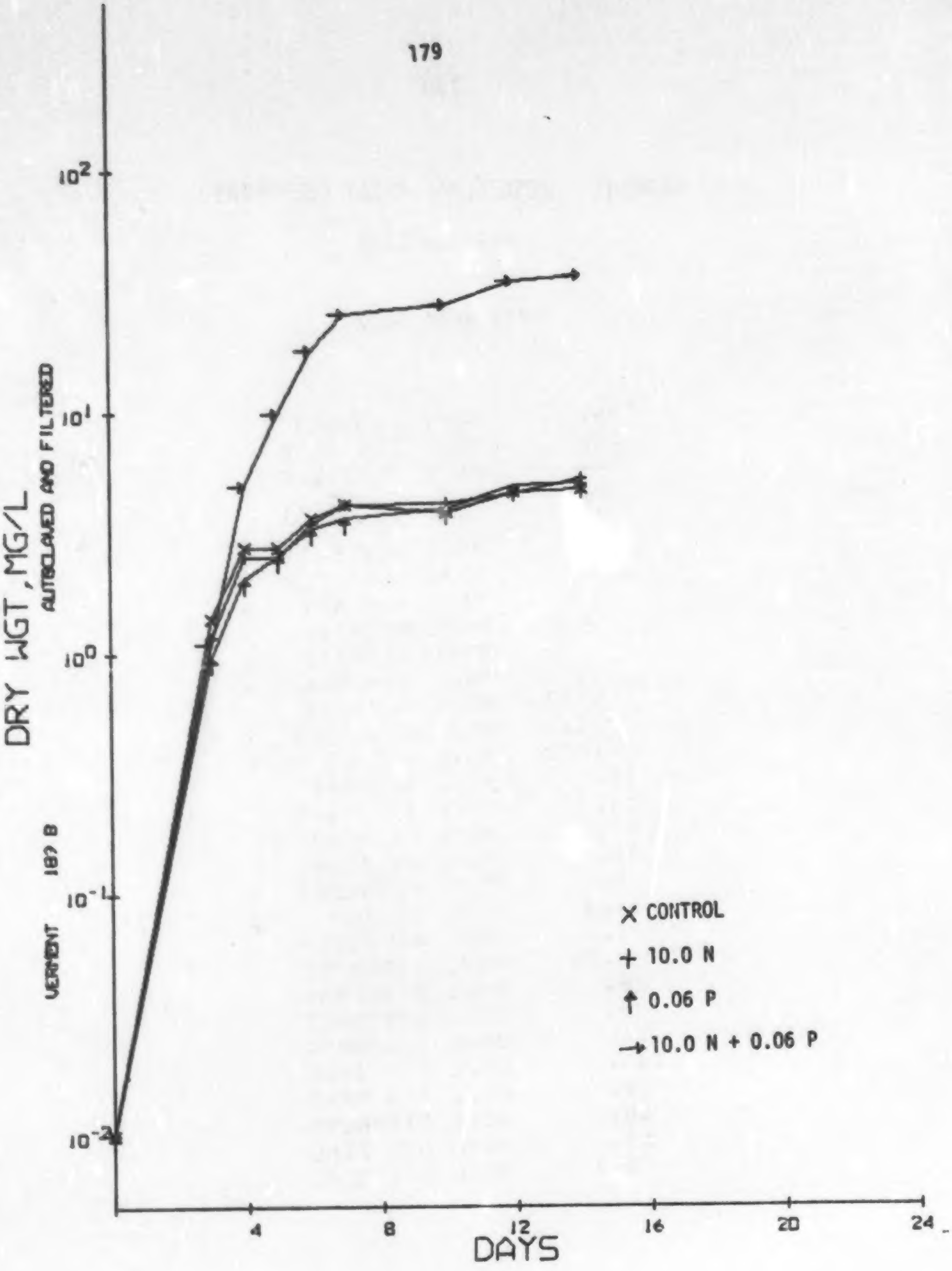
```
A     599.        UMHO CONDUCT
        2.        MG/L DIS IN C
       16.        MG/L T DISS C
       14.        MG/L D ORG C
        6.4            PH
        3.        MG/L ALKLINTY
        3.        MG/L HCO3 ALK
        2.4       MG/L KJELNIT   X
         .002     MG/L NITRITE   X
         .005     MG/L NITRATE   X
         .77      MG/L AMMONIA   X
A        .005     MG/L NO2+NO3
         .021     MG/L DIS PHOS  X
         .01      MG/L ORT AS P  X
      106.        MG/L SULFATE
       99.        MG/L TOT HARD
       90.        MG/L CA HARD
A      40.        MG/L CALCIUM
        3.        MG/L MAGNSIUM  3
        3.        MG/L MAGNSIUM  3
A       3.        MG/L MAGNSIUM
       70.        MG/L SODIUM    3
       70.        MG/L SODIUM    3
A      70.        MG/L SODIUM
        2.5       MG/L POTASIUM  3
        2.4       MG/L POTASIUM  3
A       2.45      MG/L POTASIUM
         .19      MG/L REACT SI
<      25.        UG/L DISBORON  3      58
<      25.        UG/L DISBORON  3      58
A       2.        UG/L DISCOBLT
A       9.        UG/L DISCOPPR
A     114.        UG/L DIS IRON
      [illegible]45.        UG/L DIS MANG
<      10.        UG/L DISMOLYB
A      23.        UG/L DIS ZINC
 INSUF. SAMPL     MG/L DIS MERC  I
```


DRY WGT, MG/L
FILTERED ONLY
VERMONT IP 2
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
× CONTROL
+ 10.0 N
† 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY
Station 189B

Autoclaved - Filtered

```
          289.        UMHO CCNCUCT
           22.        MG/L DIS IN C
           28.        MG/L T DISS C
            6.        MG/L D ORG C
            6.5            FH
           66.        MG/L ALKLINTY
           66.        MG/L HCO3 ALK
             .5       MG/L KJELNIT   X
             .006     MG/L NITRITE   X
             .089     MG/L NITRATE   X
             .21      MG/L AMMCNIA   X
A            .084     MG/L NO2+NO3
             .022     MG/L DIS PHOS  X
             .02      MG/L CRT AS P  X
           29.        MG/L SULFATE
           91.        MG/L TCT HARD
           79.        MG/L CA HARD
           32.        MG/L CALCIUM
            4.6       MG/L MAGNSIUM
           15.        MG/L SODIUM    U
            1.8       MG/L POTASIUM
             .44      MG/L REACT SI
           25.        UG/L DISBORON          58
            3.        UG/L DISCOBLT
            7.        UG/L DISCOPPR
           17.        UG/L DIS IRCN
            4.        UG/L DIS MANG
<          10.        UG/L DISMOLYB
           12.        UG/L DIS ZINC
             .5       UG/L DIS MERC
```

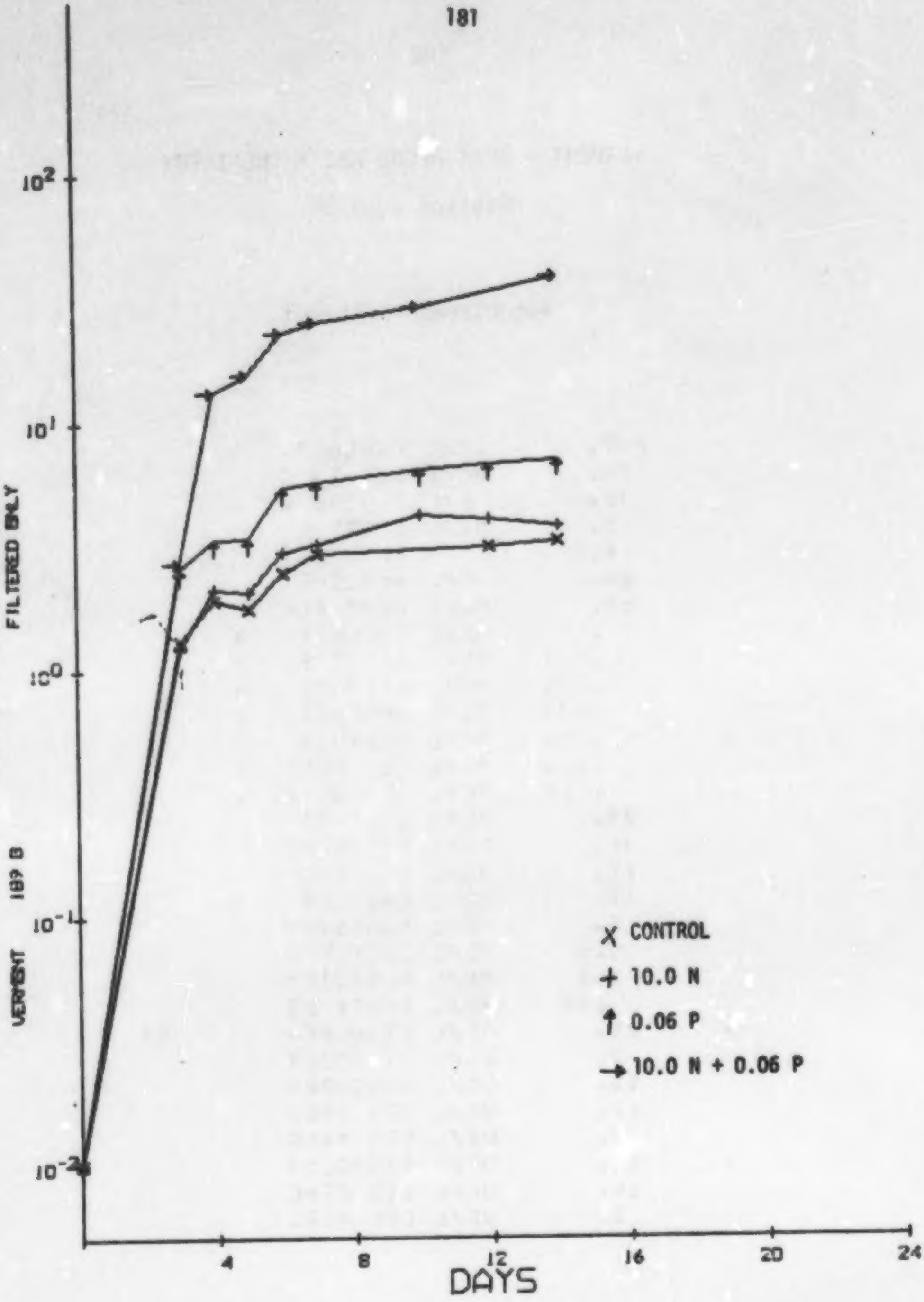

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT 187 B
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
× CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station 189B

Filtered Only

```
        284.       UMHO CONDUCT
         18.       MG/L DIS IN C
         24.       MG/L T DISS C
          6.       MG/L D ORG C
          7.5           PH
         72.       MG/L ALKLINTY
         72.       MG/L HCO3 ALK
           .5      MG/L KJELNIT    X
           .007    MG/L NITRITE    X
           .089    MG/L NITRATE    X
           .2      MG/L AMMONIA    X
A          .087    MG/L NO2+NO3
           .013    MG/L DIS PHOS   X
           .012    MG/L ORT AS P   X
         21.       MG/L SULFATE
         88.       MG/L TOT HARD
         86.       MG/L CA HARD
         31.       MG/L CALCIUM
          5.9      MG/L MAGNSIUM
         14.8      MG/L SODIUM     U
          1.8      MG/L POTASIUM
           .26     MG/L REACT SI
<        25.       UG/L DISBORON          58
          3.       UG/L DISCOBLT
         10.       UG/L DISCOPPR
        130.       UG/L DIS IRON
         31.       UG/L DIS MANG
<        10.       UG/L DISMOLYB
         19.       UG/L DIS ZINC
          2.5      UG/L DIS MERC
```

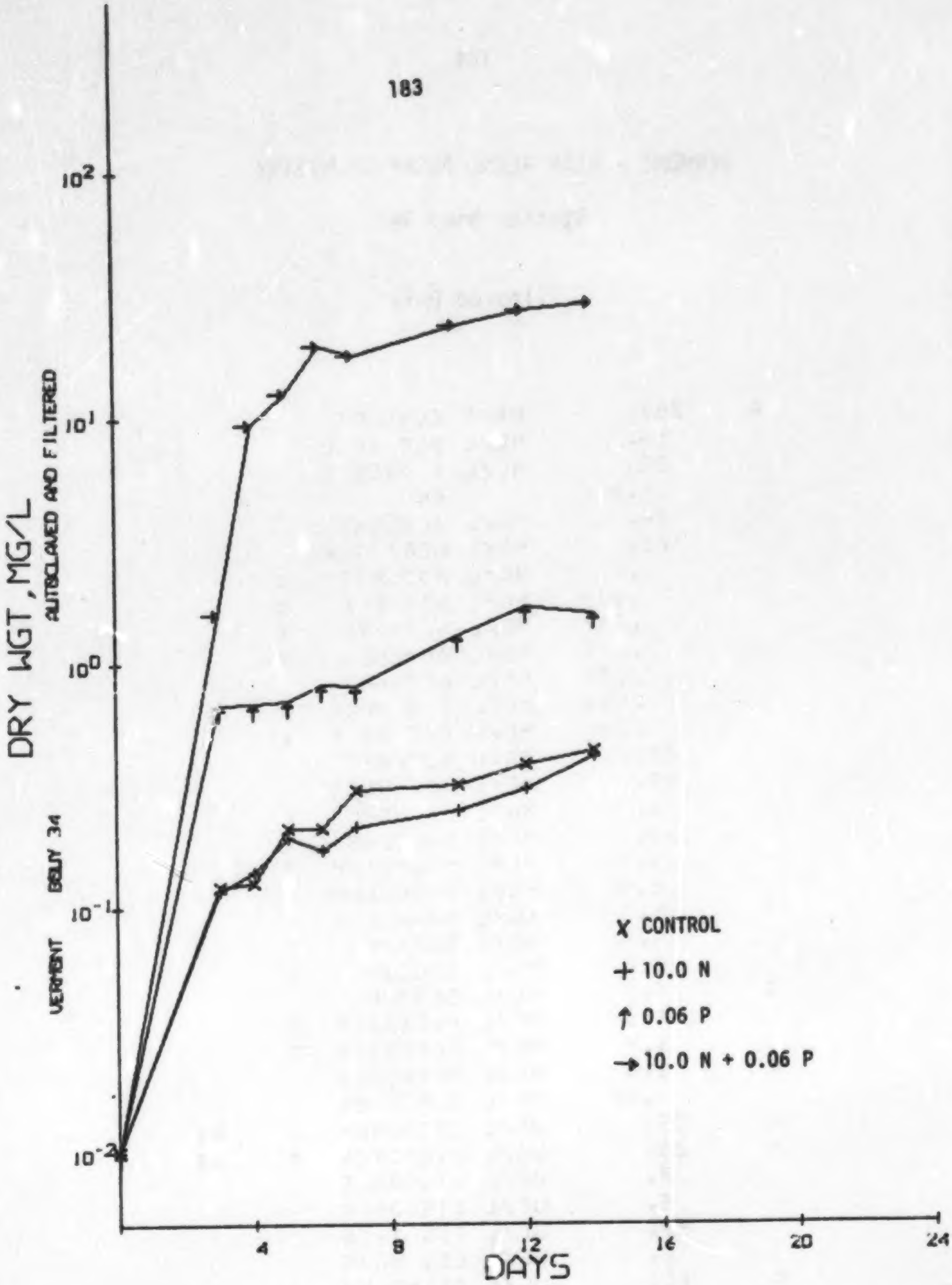

DRY WGT, MG/L
FILTERED ONLY
VERMONT 189 B
10^2
10^1
10^0
10^-1
10^-2
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station Buoy 34

Autoclaved -Filtered

```
          247.      UMHO CONDUCT
           25.      MG/L DIS IN C
           30.      MG/L T DISS C
            5.      MG/L D ORG C
            6.4          PH
           69.      MG/L ALKLINTY
           69.      MG/L HCO3 ALK
             .5     MG/L KJELNIT    X
             .007   MG/L NITRITE    X
             .096   MG/L NITRATE    X
             .138   MG/L AMMONIA    X
A            .096   MG/L NO2+NO3
             .016   MG/L DIS PHOS   X
             .018   MG/L OPT AS P   X
           25.      MG/L SULFATE
           95.      MG/L TOT HARD
           77.      MG/L CA HARD
           31.      MG/L CALCIUM
            5.      MG/L MAGNSIUM
            9.5     MG/L SODIUM
            1.6     MG/L POTASIUM
             .97    MG/L REACT SI
<          25.      UG/L DISBORON          59
            3.      UG/L DISCOBLT
           10.      UG/L DISCOPPR
           12.      UG/L DIS IRON
            2.      UG/L DIS MANG
<          10.      UG/L DISMOLYB
           14.      UG/L DIS ZINC
            1.      UG/L DIS MERC
```

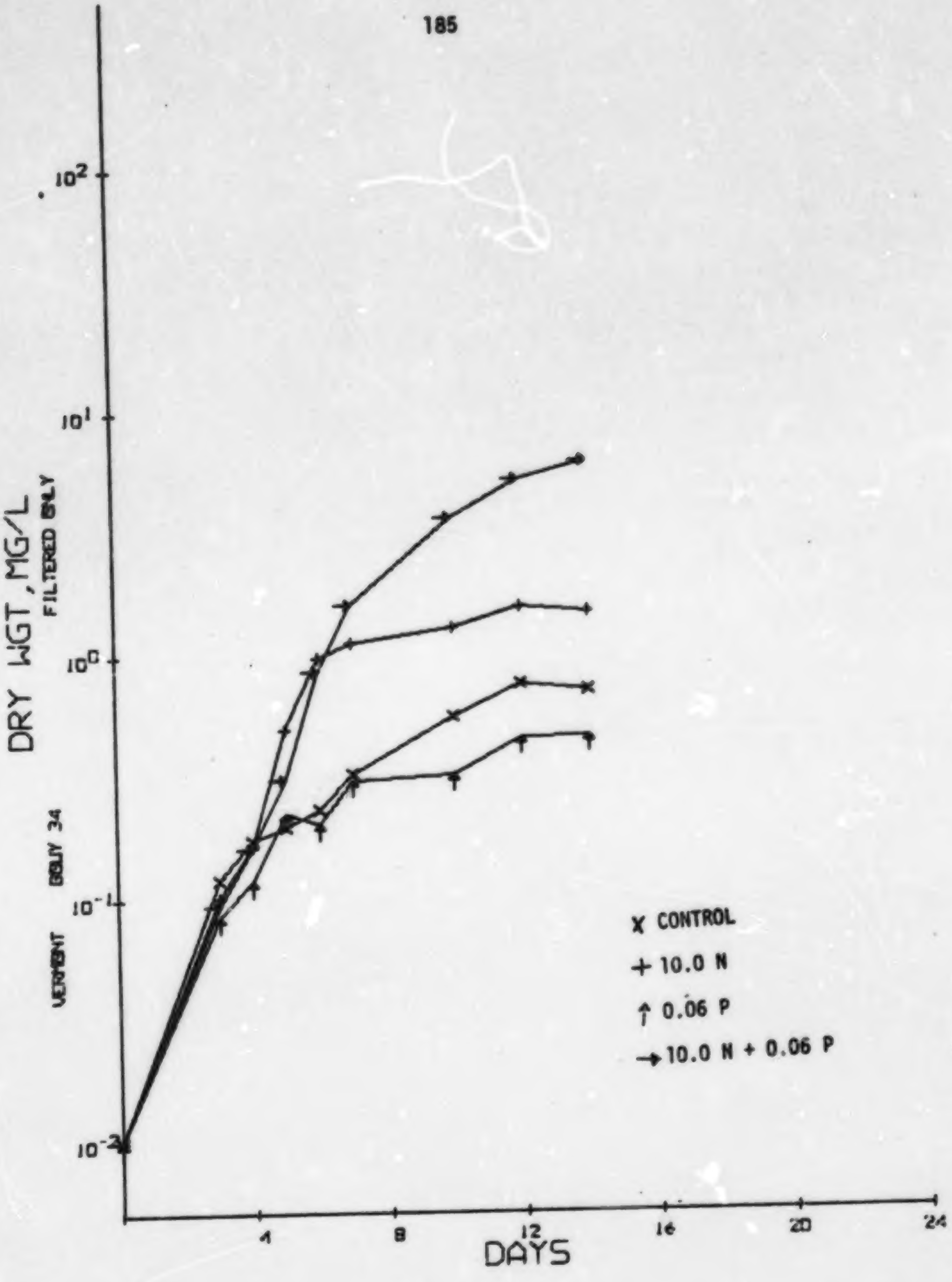

DRY WGT, MG/L
AUTOCLAVED AND FILTERED
VERMONT BELLY 34
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
χ CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

VERMONT - BEAK ALGAL ASSAY CHEMISTRY

Station Bouy 34

Filtered Only

```
A     257.        UMHO CONDUCT
       19.        MG/L DIS IN C
       23.        MG/L T DISS C
        7.2            PH
       76.        MG/L ALKLINTY
       76.        MG/L HCO3 ALK
         .5       MG/L KJELNIT    X
         .008     MG/L NITRITE    X
         .087     MG/L NITRATE    X
         .081     MG/L AMMONIA    X
         .075     MG/L NO2+NO3
         .009     MG/L DIS PHOS   X
         .005     MG/L ORT AS P   X
       27.        MG/L SULFATE
       99.        MG/L TOT HARD
       78.        MG/L CA HARD
       30.        MG/L CALCIUM
        5.9       MG/L MAGNSIUM  3
        5.9       MG/L MAGNSIUM  3
A       5.9       MG/L MAGNSIUM
        9.5       MG/L SODIUM    3
        9.5       MG/L SODIUM    3
A       9.5       MG/L SODIUM
        1.5       MG/L POTASIUM  3
        1.5       MG/L POTASIUM  3
A       1.5       MG/L POTASIUM
         .36      MG/L REACT SI
<      25.        UG/L DISBORON  3      58
<      25.        UG/L DISBORON  3      58
        2.        UG/L DISCOBLT
        9.        UG/L DISCOPPR
       87.        UG/L DIS IRON
        9.        UG/L DIS MANG
<      10.        UG/L DISMOLYB
       17.        UG/L DIS ZINC
        5.        UG/L DIS MERC
```


DRY WGT, MG/L
FILTERED ONLY
VERMONT
BOLIY 34
10^2
10^1
10^0
10^{-1}
10^{-2}
4
8
12
16
20
24
DAYS
X CONTROL
+ 10.0 N
↑ 0.06 P
→ 10.0 N + 0.06 P

APPENDIX E

MEMO REGARDING PRESERVATION OF SUB-SAMPLES FOR NUTRIENT ANALYSIS

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA FPMR (41 CFR) 101-11.6
UNITED STATES GOVERNMENT

Memorandum

TO : The Record **DATE:** February 1, 1973

FROM : Jack H. Gakstatter
Chief, National Eutrophication Survey Program

SUBJECT: Lake Champlain Algal Assay Samples Collected by Vermont

This memo refers only to those ten samples collected from Lake Champlain by Vermont (and T. W. Beak Consultants) September 27, 1972 and October 3, 1972. After collection the samples were frozen and sent air freight to Corvallis, Oregon arriving on October 6, 1972. Upon receipt the samples were placed in a refrigerator. On October 12 processing of the samples began, i.e. they were split into equal portions and each portion was either filtered (0.45 micron pore size) or autoclaved and then filtered. This is the point at which the improper amount of mercuric chloride preservative was added.

The question will probably arise as to why we bothered to preserve the samples anyway after they had been in a relatively unpreserved state (except for cooling which certainly retards biological activity and is an accepted preservative method for short periods) from October 6 to October 12. The reply to the question is that CLS (Consolidated Laboratory Services) provides analytical services to the entire laboratory on a first come - first serve basis. Samples submitted for analysis are not refrigerated by CLS and since there is no guarantee that the analytical work will be done immediately, it is standard procedure to preserve the samples with mercuric chloride (40 mg/l).

After the filteration or autoclaving-filteration, aliquots were taken from each portion of each sample to be preserved with mercuric chloride and sent to CLS for analysis. My algal assay staff inadvertently picked up the wrong container of mercuric chloride to do the preserving. The net result was that instead of preserving at a concentration of 40 mg/l mercuric chloride, each aliquot contained only 0.04 mg/l mercuric chloride which was insufficient to prevent biological activity. The improperly preserved samples were sent to CLS on October 12 and analyses did not begin until October 25.

5010-108

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The question has also been raised as to why analyses were not done on the raw samples before autoclaving-filteration or filteration. At the time these samples were received, my staff indicated that there was not enough sample volume to get an analysis for each raw sample, as well as after each treatment. Faced with the choice of either analyzing before or after the autoclaving-filteration or filteration process, they chose to analyze after the treatments but before the samples were set up for the algal assay so that the chemistry in the water just prior to the assay would be known.

Jack H. Gakstatter

Jack H. Gakstatter

cc: Allyn Hemenway, Region I

APPENDIX F

MUNICIPAL SEWAGE TREATMENT PLANT
and
INTERNATIONAL PAPER CO. EFFLUENT DATA

Phosphate Concentrations and Flow Rates for the International Paper Company Mill Effluent During 1972-73
Data Provided by the New York Department of Environmental Conservation

Month & Year	Effluent Flow (mgd)	Phosphate Conc. (mg/l as PO_4)	Total pounds Phosphorus discharged daily (as P)
Jan 1972	14.8	1.7	67.9
Feb 1972	15.3	1.8	75.3
Mar 1972	16.1	2.3	100.8
Apr 1972	15.3	2.4	99.5
May 1972	17.1	1.07	48.5
June 1972	18.8	1.34	69.0
July 1972	19.7	1.3	69.0
Aug 1972	21.3	0.78	44.4
Sep 1972	17.2	2.3	107.7
Oct 1972	16.3	1.8	78.9
Nov 1972	16.4	0.8	35.6
Dec 1972	14.8	0.4	16.1
Jan 1973	15.1	0.6	25.2
Feb 1973	12.4	0.6	20.7
Mar 1973	13.4	2.0	72.6
Apr 1973	15.3	1.6	66.4
May 1973	17.9	2.0	97.1
June 1973	20.7	1.7	95.0

Average discharge equals 66 lbs P/day or 24,090 lbs P/year

```
STORET RETRIEVAL DATE 74/11/27
                                                                      360952          PR360952     P027000
                                                                     44 42 00.0 073 27 00.0
                                                                     PLATTSBURG (CITY OF)
                                                                     36013   7.5 PLATTSBURG
                                                                     D/LAKE CHAMPLAIN
                                                                     LAKE CHAMPLAIN
                                                                     11EPALES                 2141204
                                                                     4                      0000 FEET  DEPTH

                            00630      00625      00610      00671      00665      50051      50053
  DATE    TIME DEPTH    NO2&NO3    TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT     FLOW      CONDUIT
  FROM     OF           N-TOTAL       N        TOTAL     ORTHO                  RATE      FLOW-MGD
   TO     DAY   FEET      MG/L       MG/L       MG/L     MG/L P     MG/L P    INST MGD    MONTHLY

73/01/09 11 00
CP(T)-                   0.630     24.000      3.400      2.900                 6.200      7.100
73/01/09 15 00
73/02/06 09 45
CP(T)-                   0.700     22.000      2.700      2.850      6.700      7.050      6.700
73/02/06 15 15
73/03/02 11 00
CP(T)-                   0.260     31.000      5.600      3.500      7.650      6.700      6.300
73/03/02 16 00
73/04/10 11 00
CP(T)-                   1.200     13.800      1.900      1.400      2.100      7.100      7.120
73/04/10 13 00
73/05/07 11 00
CP(T)-                   0.470     24.000      3.700      3.160      7.400      6.350      6.600
73/05/07 15 00
73/05/08                 1.200      7.300      0.630      0.750      1.750
73/06/07 11 00
CP(T)-                   0.640     15.000      0.520      1.580      3.800      6.560
73/06/07 16 00
73/07/05 11 00
CP(T)-                   0.480     16.000      2.500      1.470      3.200      5.100      6.200
73/07/05 15 30
73/08/06 11 00
CP(T)-                   0.140     17.000      1.680      1.600      3.200      5.950      5.130
73/08/06 14 30
73/09/07 08 00
CP(T)-                   0.105     15.700                 1.320                 4.250      5.000
73/09/07 14 00
73/10/01 10 30
CP(T)-                   0.110     25.100     11.600      3.150      5.900      6.000      5.000
73/10/01 14 45
73/11/02 09 00
CP(T)-                  14.400      3.500      0.150      2.600      3.300
73/11/02 13 00
73/12/05 11 30
CP(T)-                   0.060     15.600      0.277      0.740      2.650     12.000     12.000
73/12/05 15 30
```

```
STORET RETRIEVAL DATE 74/11/27                                      360952        PR360952     P027000
                                                                   44 42 00.0 073 27 00.0
                                                                   PLATTSBURG (CITY OF)
                                                                   36013   7.5 PLATTSBURG
                                                                   D/LAKE CHAMPLAIN
                                                                   LAKE CHAMPLAIN
                                                                   11EPALES                  2141204
                                                                   4                       0000 FEET  DEPTH

                            00630     00625     00610     00671     00665     50051     50053
 DATE    TIME DEPTH NO2&NO3   TOT KJEL   NH3-N   PHOS-DIS  PHOS-TOT    FLOW    CONDUIT
 FROM     OF         N-TOTAL     N       TOTAL    ORTHO                RATE   FLOW-MGD
  TO     DAY  FEET    MG/L      MG/L     MG/L     MG/L P    MG/L P   INST MGD  MONTHLY

74/01/03 11 00
CP(T)-               0.480    15.500     0.750     0.000     1.500    16.000    16.000
74/01/03 16 00
```

```
STORET RETRIEVAL DATE 74/12/27                                        500151          PA500151      P021500
                                                                     44 29 00.0 073 13 30.0
                                                                     BURLINGTON MAIN
                                                                     50       7.5 BURLINGTON
                                                                     D/LAKE CHAMPLAIN
                                                                     LAKE CHAMPLAIN
                                                                     11EPALES                   2141204
                                                                     4                         0000 FEET  DEPTH

                         00630      00625      00610      00671      00665      50051      50053
  DATE   TIME DEPTH    NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
  FROM    OF           N-TOTAL       N        TOTAL      ORTHO                  RATE     FLOW-MGD
   TO    DAY   FEET     MG/L       MG/L        MG/L      MG/L P     MG/L P    INST MGD   MONTHLY

72/11/29 08 00                                                                 3.010      3.000
CP(T)-                  0.760     21.000      1.470      2.000      2.650
72/11/29 16 00
72/12/29 08 00                                                                 3.200      3.000
CP(T)-                  0.490     26.000      4.000      3.800      8.475
72/12/29 16 00
73/01/31 08 00                                                                 3.000      3.450
CP(T)-                  0.880     22.000      5.600      2.600      4.300
73/01/31 15 00
73/03/02 08 00                                                                 3.000      3.000
CP(T)-                  0.760     27.000      8.350      3.500      7.200
73/03/02 16 00
73/03/30 08 00                                                                 3.000      3.400
CP(T)-                  3.300     21.000      3.300      3.500      7.500
73/03/30 16 00
73/04/30 08 00                                                                 3.000      3.000
CP(T)-                  0.590     24.000      3.900      3.100      8.250
73/04/30 16 00
73/05/04 08 00                                                                 3.500      3.000
CP(T)-                  1.200     17.000      1.260      1.700      2.800
73/05/04 16 00
73/07/02 08 00                                                                 3.000      3.000
CP(T)-                  0.430     14.000      1.000      1.890      4.800
73/07/02 16 00
73/07/31 08 00                                                                 3.000      3.000
CP(T)-                  0.170     17.600      3.200      1.380
73/07/31 16 00
73/08/31 08 00                                                                 2.990      3.150
CP(T)-                                                   2.020      2.400
73/08/31 16 00
73/09/30 08 00                                                                 2.860      3.100
CP(T)-                  3.400     15.000      2.800      4.100      4.400
73/09/30 16 00
73/10/31 08 00                                                                 3.490      3.310
CP(T)-                  0.230     13.500      3.300      3.400      4.200
73/10/31 16 00
```

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STORET RETRIEVAL DATE 74/12/27                                          500154          AS500154      P000900
                                                                     44 27 30.0 073 13 30.0
                                                                     SOUTH BURLINGTON BARTLETS BAY RD
                                                                     50        7.5 BURLINGTON
                                                                     D/LAKE CHAMPLAIN
                                                                     LAKE CHAMPLAIN
                                                                     11EPALES                    2141204
                                                                     4                        0000 FEET  DEPTH

                                 00430      00625     00610      00671      00665      50051      50053
DATE      TIME DEPTH  NO2&NO3   TOT KJEL    NH3-N   PHOS-DIS   PHOS-TOT    FLOW     CONDUIT
FROM       OF         N-TOTAL      N        TOTAL     ORTHO                 RATE     FLOW-MGD
 TO       DAY  FEET     MG/L      MG/L       MG/L     MG/L P     MG/L P   INST MGD   MONTHLY

72/11/28 09 00
CP(T)-                 2.270     1.200      0.090     4.287                 0.450      0.450
72/11/28 16 00
72/12/28 09 00
CP(T)-                 6.300     2.180      0.078     6.300      6.700      0.480      0.450
72/12/28 16 00
73/01/25 08 00
CP(T)-                 5.560     1.700      0.140     3.300      3.500      0.600      0.550
73/01/25 12 00
73/02/21 08 00
CP(T)-                 0.320     3.400      0.330     7.560      7.700      0.490      0.520
73/02/21 14 00
73/03/23 08 00
CP(T)-                 6.800     0.600      0.042     3.700      3.750      0.624      0.600
73/03/23 16 00
73/05/07 08 00
CP(T)-                 6.500     1.100      0.125     5.600      5.900      0.520      0.600
73/05/07 16 00
73/05/23 08 00
CP(T)-                 4.900    11.300      0.145     1.800      2.000      0.740      0.600
73/05/23 16 00
73/06/25 08 00
CP(T)-                12.000     0.950      0.057     4.000      4.000      0.550      0.600
73/06/25 15 00
73/08/24 08 00
CP(T)-                 7.600     0.390      0.006                5.500      0.410      0.500
73/08/24 16 00
73/10/11 08 00
CP(T)-                11.200     1.850      0.110     7.100      7.200      0.400      0.500
73/10/11 16 00
73/10/29 08 00
CP(T)-                11.200     0.700      0.082     7.000      7.200      0.400      0.410
73/10/29 16 00
73/12/03 08 00
CP(T)-                 9.800     0.500      0.058     5.100      5.200      0.440      0.450
73/12/03 16 00
```

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STORET RETRIEVAL DATE 74/12/27                                          500159         MA500159      P005350
                                                                       44 29 00.0 073 06 30.0
                                                                       ESSEX JCT
                                                                       50       15 BURLINGTON
                                                                       T/LAKE CHAMPLAIN
                                                                       WINOOSKI RIVER
                                                                       11EPALES                     2141204
                                                                       4                           0000 FEET  DEPTH

                             00630      00625      00610      00671      00665      50051      50053
 DATE    TIME DEPTH  NO2&NO3   TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
 FROM     OF         N-TOTAL      N        TOTAL      ORTHO                  RATE     FLOW-MGD
  TO     DAY   FEET    MG/L      MG/L       MG/L      MG/L P     MG/L P    INST MGD   MONTHLY

72/11/24 11 00
CP(T)-                 0.250    43.000      2.700     1.160      4.000      0.350      0.500
72/11/24 16 00
72/12/29 11 00
CP(T)-                 0.630    41.000     10.500     3.900      4.500      0.360      0.400
72/12/29 16 00
73/01/26 10 00
CP(T)-                 1.500    37.000     11.650     3.950      7.400      0.372      0.424
73/01/26 15 00
73/02/23 11 00
CP(T)-                 0.620    36.000     14.400     6.100     10.500      0.550      0.513
73/02/23 15 00
73/03/30 10 00
CP(T)-                 1.400    30.500      8.700     4.100      9.000      0.650      0.650
73/03/30 15 00
73/04/27 10 00
CP(T)-                 1.200    28.500      9.950     3.950      7.500      0.650      0.650
73/04/27 15 00
73/05/25 11 00
CP(T)-                 1.470    23.000      8.350     3.200      6.200      0.650      0.650
73/05/25 15 00
73/06/29 10 00
CP(T)-                 0.620    22.000      8.600     3.100      6.000      0.930      0.923
73/06/29 15 00
73/07/27 10 00
CP(T)-                 0.630    23.100      8.400     1.400      6.000      0.750      0.300
73/07/27 15 00
73/08/31 11 00
CP(T)-                          33.600                3.620      6.400      0.750      0.750
73/08/31 15 00
73/09/28 10 00
CP(T)-                 0.400    26.000     14.700     3.990      7.350      0.750      0.750
73/09/28 14 00
73/10/29 10 00
CP(T)-                 0.310    34.000     14.000     4.400      6.900      0.750      0.750
73/10/29 14 00
```

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STORET RETRIEVAL DATE 74/12/27                                           5001T1          AS5001T1      P004000
                                                                         44 29 00.0 073 06 00.0
                                                                         ESSEX JCT IHM
                                                                         50       15 BURLINGTON
                                                                         T/LAKE CHAMPLAIN
                                                                         WINOOSKI RIVER
                                                                         11EPALES                  2141204
                                                                         4                         0000 FEET  DEPTH

                              00630      00625      00610      00671      00665      50051      50053
 DATE    TIME DEPTH NO2&NO3  TOT KJEL   NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
 FROM     OF         N-TOTAL     N      TOTAL     ORTHO                  RATE     FLOW-MGD
  TO     DAY  FEET    MG/L      MG/L     MG/L     MG/L P     MG/L P    INST MGD   MONTHLY

72/12/05 00 00
CP(T)-               19.000    29.400    28.000    0.198      0.242                0.730
72/12/05 24 00
73/01/09 00 00
CP(T)-               18.700    24.000    23.700    0.022      0.250      0.484     0.699
73/01/10 24 00
73/01/30 11 00
CP(T)-                0.800    35.700     6.100    3.900      7.900      0.622     0.670
73/01/30 16 00
73/02/13 08 00
CP(T)-               19.200    31.100    31.020    0.115      0.172      1.040     0.680
73/02/14 08 00
73/03/06 08 00
CP(T)-               17.200    28.000    22.500    0.140      0.400      0.938     0.947
73/03/07 08 00
73/04/10 08 00
CP(T)-               21.800    31.000     9.900    0.120      0.190      0.825     0.763
73/04/11 08 00
73/05/15 08 00
CP(T)-               20.400    37.800    34.400    0.040      0.170      0.808     0.874
73/05/16 08 00
73/06/12 08 00
CP(T)-               14.000    28.700    28.500                          0.911     0.868
73/06/13 08 00
73/07/17 12 00
CP(T)-               14.400    23.500    20.650    0.230      0.342      1.000     0.981
73/07/18 12 00
73/08/14 08 00
CP(T)-                9.900    26.500    25.000    0.058      0.095      0.950     0.900
73/08/15 08 00
73/09/18 08 00
CP(T)-               23.000    19.020    17.650    0.170      0.190      0.610     0.933
73/09/19 08 00
73/10/16 00 00
CP(T)-               17.800    26.000     5.500    0.140      0.600      0.803     0.614
73/10/16 24 00
```

```
STORET RETRIEVAL DATE 74/12/27
                                                              500171          AS500171     P004000
                                                              44 29 00.0 073 06 00.0
                                                              ESSEX JCT IBM
                                                              50        15 BURLINGTON
                                                              T/LAKE CHAMPLAIN
                                                              WINOOSKI RIVER
                                                              11EPALES                 2141204
                                                              4                        0000 FEET  DEPTH

                                                                            50051      50053
                          00630      00625      00610      00671      00665      FLOW       CONDUIT
 DATE    TIME DEPTH NO2&NO3    TOT KJEL   NH3-N      PHOS-DIS   PHOS-TOT   RATE       FLOW-MGD
 FROM     OF        N-TOTAL       N       TOTAL      ORTHO                 INST MGD   MONTHLY
  TO     DAY  FEET    MG/L      MG/L      MG/L       MG/L P     MG/L P

73/11/27 08 00
CP(T)-                          19.200                                     0.709      0.814      0.535
73/11/28 08 00
```

```
STORET RETRIEVAL DATE 74/12/27                                             500153          AS500153       P009000
                                                                           44 29 30.0 073 11 00.0
                                                                           BURLINGTON RIVERSIDE
                                                                           50      7.5 BURLINGTON
                                                                           T/LAKE CHAMPLAIN
                                                                           WINOOSKI RIVER
                                                                           11EPALES                 2141204
                                                                           4                      0000 FEET  DEPTH

                                                           00671     00665     50051     50053
                        00630     00525     00610      PHOS-DIS  PHOS-TOT     FLOW     CONDUIT
 DATE   TIME DEPTH   NO2&NO3   TOT KJEL    NH3-N       ORTHO                  RATE     FLOW-MGD
 FROM    OF          N-TOTAL      N        TOTAL       MG/L P    MG/L P    INST MGD   MONTHLY
  TO    DAY   FEET    MG/L      MG/L       MG/L

72/11/29 08 00
CP(T)-                 0.540    23.000     4.300      2.150                 0.510     0.500
72/11/29 16 00
72/12/29 08 00
CP(T)-                 0.800    11.750     5.700      3.300     3.500      0.400
72/12/29 16 00
73/02/01               8.640    40.000     2.600      1.580     4.100
73/02/28 09 30        12.000     5.600     3.200      6.275                0.730     0.570
73/03/29 10 00        13.200     2.730     0.790      3.500     3.850      0.550     0.500
73/05/01 08 00
CP(T)-                 6.900     3.800     2.000      2.700     3.150      0.709     0.700
73/05/01 16 00
73/05/29 08 00
CP(T)-                 8.400     2.700     1.370      2.100     2.400      0.658
73/05/29 16 00
73/06/30 10 00
CP(T)-                 5.300     1.680     0.380                1.175      1.010
73/06/30 16 00
73/07/30 08 00
CP(T)-                                                                     0.819     0.799
73/07/30 12 00
73/08/31 08 00
CP(T)-                           1.260     0.115      2.080     2.300      0.894     0.756
73/08/31 16 00
73/09/30 00 00        12.400     3.800     1.900      3.735     6.200      0.756     1.000
73/10/31 09 00        12.600     0.500K    0.170      4.000     4.200      1.130     1.000


                  K VALUE KNOWN TO BE
                  LESS THAN INDICATED
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STORET RETRIEVAL DATE 74/12/27
                                                              500156          AS500156      P002000
                                                             44 32 30.0 072 09 00.0
                                                             COLCHESTER
                                                             50       1-250000 LK CHAM
                                                             T/LAKE CHAMPLAIN
                                                             WINOOSKI RIVER
                                                             11EPALES                  2141204
                                                             4                        0000 FEET  DEPTH

                                 00630     00625      00610     00671      00665      50051      50053
   DATE     TIME DEPTH NO2&NO3  TOT KJEL  NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
   FROM      OF        N-TOTAL     N       TOTAL     ORTHO                  RATE     FLOW-MGD
    TO      DAY  FEET    MG/L     MG/L      MG/L     MG/L P     MG/L P    INST MGD   MONTHLY

72/12/01 09 00
CP(T)-                 0.960     11.000     2.900     2.475      3.250      0.162      0.158
72/12/01 18 00
73/01/05 09 00
CP(T)-                 5.100      2.100     0.120     3.150      3.600      0.123      0.138
73/01/05 18 00
73/02/05 09 00
CP(T)-                 0.140     15.400     7.700     4.400      5.300      0.210      0.166
73/02/05 18 00
73/03/05 08 00
CP(T)-                 0.185     11.000     8.200     2.350      2.350      0.192      0.185
73/03/05 18 00
73/04/01 08 00
CP(T)-                 0.070      9.500     5.400     2.700      2.900      0.172      0.158
73/04/01 18 00
73/05/06 08 00
CP(T)-                 0.230      6.100     2.700     2.800      2.400      0.200      0.149
73/05/06 18 00
73/06/03 08 00
CP(T)-                 0.135      3.500               2.700      2.400      0.153      0.169
73/06/03 18 00
73/07/04 08 00
CP(T)-                 0.210      5.100     1.050     0.230      0.490      0.218      0.196
73/07/04 18 00
73/08/04 08 00
CP(T)-                 0.100      5.800     0.260     2.840      3.400      0.197      0.195
73/08/04 18 00
73/09/01 08 00
CP(T)-                 0.190      3.300     0.240     2.660                 0.163      0.174
73/09/01 18 00
73/09/30 08 00
CP(T)-                 0.210     10.000     4.000     3.300      3.400      0.217      0.221
73/09/30 18 00
73/11/01 08 00
CP(T)-                 0.230     20.000     7.100     8.000      4.600      0.211      0.197
73/11/01 18 00
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STORET RETRIEVAL DATE 74/12/27
                                                                     500156          A5500156     P002000
                                                                    44 32 30.0 072 09 00.0
                                                                    COLCHESTER
                                                                    50        1-250000 LK CHAM
                                                                    T/LAKE CHAMPLAIN
                                                                    WINOOSKI RIVER
                                                                    11EPALES                  2141204
                                                                    4                         0000 FEET  DEPTH

                               00630      00625      00610      00671      00665      50051      50053
  DATE     TIME DEPTH NO2&NO3  TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT     FLOW     CONDUIT
  FROM      OF         N-TOTAL     N       TOTAL     ORTHO                RATE     FLOW-MGD
   TO      DAY  FEET    MG/L      MG/L      MG/L     MG/L P     MG/L P   INST MGD  MONTHLY

74/01/12 08 00                                       2.400      3.725      0.166      0.181
CP(T)-            0.040                0.200
74/01/12 18 00
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STORET RETRIEVAL DATE 74/12/27
                                                                  500152        PA500152      P007000
                                                                 44 31 30.0 073 16 00.0
                                                                 BURLINGTON NORTH END
                                                                 50       7.5 BURLINGTON
                                                                 T/LAKE CHAMPLAIN
                                                                 WINOOSKI RIVER
                                                                 11EPALES                 2141204
                                                                 4                       0000 FEET  DEPTH

                           00630      00625      00610      00671      00665      50051      50053
   DATE   TIME DEPTH NO2&NO3        TOT KJEL     NH3-N    PHOS-DIS   PHOS-TOT      FLOW     CONDUIT
   FROM    OF        N-TOTAL          N        TOTAL      ORTHO                  RATE     FLOW-MGD
    TO    DAY  FEET    MG/L          MG/L       MG/L      MG/L P     MG/L P    INST MGD   MONTHLY

72/12/01 08 00
CP(T)-                0.420     26.000     16.000      4.675                 1.100      1.050
72/12/01 15 00
72/12/29 08 00
CP(T)-                0.410     30.000     11.800      4.300      9.350      1.100      1.130
72/12/29 15 00
73/02/27 09 00        0.430     24.000     10.800      4.100      6.600      1.170      1.330
73/03/30 08 00
CP(T)-                          24.000      8.100      3.942      5.800      1.500      1.200
73/03/30 15 00
73/05/02 08 00
CP(T)-                1.580     19.800      4.400      2.000      3.000      1.150      1.200
73/05/02 15 00
73/05/30 10 30        1.590     21.000      6.300      2.200      3.300      2.000      1.700
73/07/01 09 00        2.000      5.800      0.820      0.530      1.050      1.900      1.700
73/07/30 15 00        0.200     13.000      5.300      1.800      3.750      1.500      1.500
73/08/30 11 00                   1.100                            5.770      1.150      1.200
73/09/28 08 00
CP(T)-                0.050     25.700     11.600      4.900      8.400      1.200      1.300
73/09/28 16 00
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STORET RETRIEVAL DATE 74/12/27
                                                                  5001U3          PW5001U3      P005400
                                                                 44 29 30.0 073 09 30.0
                                                                 SOUTH BURLINGTON AIRPORT PKWY
                                                                 50      7.5 BURLINGTON
                                                                 T/LAKE CHAMPLAIN
                                                                 WINOOSKI RIVER
                                                                 11EPALES                   2141204
                                                                 4                         0000 FEET  DEPTH

                             00630     00625     00610      00671      00665      50051      50053
  DATE    TIME DEPTH NO2&NO3  TOT KJEL   NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
  FROM     OF        N-TOTAL     N       TOTAL     ORTHO                  RATE     FLOW-MGD
   TO     DAY  FEET    MG/L     MG/L      MG/L     MG/L P     MG/L P    INST MGD   MONTHLY

73/01/10 08 00
CP(T)-                0.010K   33.300    28.700     6.800      6.820      0.680      0.700
73/01/10 16 00
73/02/07 08 00
CP(T)-                0.620    28.000    10.400     4.100      7.800      0.730      0.750
73/02/07 16 00
73/03/08 08 00
CP(T)-                0.750    26.000    10.000     3.400      6.000      0.760      0.680
73/03/08 15 00
73/04/08 08 00
CP(T)-                1.470    20.500     5.700     2.300      4.400      1.060      0.820
73/04/09 16 00
73/05/02 08 00
CP(T)-                0.575    33.600    12.000     4.000      7.600      0.750      0.850
73/05/02 16 00
73/06/07 08 00
CP(T)-                0.740    23.600     6.550     3.100      6.350      1.000      0.900
73/06/07 16 00
73/07/02 08 00
CP(T)-                0.780    16.000     3.920                5.250      1.300      0.900
73/07/02 16 00
73/08/07 08 00
CP(T)-                0.070    25.000     6.200     2.520      8.100      0.850      0.750
73/08/07 15 00
73/09/05 09 00
CP(T)-                0.132    34.500    15.200     5.200                 0.700      0.800
73/09/05 16 00
73/10/03 08 00
CP(T)-                0.050    30.006    15.000     5.500      8.200      0.750      0.800
73/10/03 15 00
73/11/05 08 00
CP(T)-                0.040    31.000    16.000     5.200      8.200      0.650      0.600
73/11/05 16 00
73/12/06 08 00
CP(T)-                0.520    26.000     9.300     3.780      6.400      0.700      0.650
73/12/06 16 00
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STORET RETRIEVAL DATE 74/12/27
                                                                 5001U3          PH5001U3      P005600
                                                                44 29 30.0 073 09 30.0
                                                                SOUTH BURLINGTON AIRPORT PKWY
                                                                50      7.5 BURLINGTON
                                                                T/LAKE CHAMPLAIN
                                                                WINOOSKI RIVER
                                                                11EPALES                 2141204
                                                                4                        0000 FEET  DEPTH

                         00630     00625     00610      00671      00665     50051     50053
  DATE   TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
  FROM    OF        N-TOTAL       N      TOTAL      ORTHO                  RATE     FLOW-MGD
   TO    DAY  FEET    MG/L       MG/L     MG/L      MG/L P     MG/L P   INST MGD   MONTHLY

74/01/07 08 00
CP(T)-                0.680     8.600     2.400      1.560      2.400     0.850      0.900
74/01/07 16 00
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STORET RETRIEVAL DATE 74/12/27
                                                                     5001T8          PK5001T8      P000600
                                                                    44 23 00.0 073 13 30.0
                                                                    SHELBURNE FIRE DIST #2
                                                                    50       7.5 BURLINGTON
                                                                    1/LAKE CHAMPLAIN
                                                                    LA PLATTE RIVER
                                                                    11EPALES                 2141204
                                                                    4                       0000 FEET  DEPTH

                                00630      00625      00610      00671      00665      50051      50053
  DATE    TIME DEPTH  NO2&NO3    TOT KJEL    NH3-N     PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
  FROM     OF         N-TOTAL       N        TOTAL      ORTHO                  RATE     FLOW-MGD
   TO     DAY   FEET   MG/L       MG/L       MG/L      MG/L P     MG/L P    INST MGD   MONTHLY

72/11/30 08 00
CP(T)-                 1.680     24.000      0.044      2.400      4.300      0.130      0.120
72/11/30 16 00
73/01/02 08 00
CP(T)-                 1.520     18.000      0.078      2.325      6.575      0.140      0.120
73/01/02 16 00
73/01/31 08 00
CP(T)-                 0.670     24.000      6.000      2.800      4.600      0.120      0.130
73/01/31 16 00
73/03/05 07 00
CP(T)-                 0.980     18.900      0.710      4.300      8.000      0.130      0.140
73/03/05 15 30
73/04/23 08 00
CP(T)-                 0.930                 5.600      4.586      9.800      0.130      0.130
73/04/23 16 00
73/06/30 14 00         4.200     17.000      3.700      1.600      3.000      0.130      0.130
73/07/04 13 00         3.780      5.000      3.000      1.600      2.900      0.120      0.130
73/09/30 11 00         0.260     42.000     16.300      4.760      7.900      0.130      0.130
73/10/23 09 30         0.390     43.000     17.000      4.700      7.500      0.130      0.120
73/12/22 12 00         1.320     22.000      1.260      2.600      7.000      0.140      0.140
74/01/03 13 30         1.400     20.000      0.410      2.800      6.850      0.150      0.140
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STORET RETRIEVAL DATE 74/12/27
                                                              5001T5        PR5001T5     P003800
                                                             44 01 00.0 073 10 30.0
                                                             MIDDLEBURY
                                                             50       1/250000 LK CHAM
                                                             T/LAKE CHAMPLAIN
                                                             OTTER CREEK
                                                             11EPALES                2141204
                                                             4                      0000 FEET  DEPTH

                          00630     00625     00610     00671     00665     50051     50053
  DATE   TIME DEPTH NO2&NO3   TOT KJEL   NH3-N    PHOS-DIS  PHOS-TOT    FLOW    CONDUIT
  FROM    OF        N-TOTAL      N       TOTAL     ORTHO                RATE    FLOW-MGD
   TO    DAY  FEET    MG/L      MG/L      MG/L     MG/L P    MG/L P   INST MGD  MONTHLY

72/11/21               0.660     5.500     0.236     0.870     1.200
72/12/19 07 00
CP(T)-                 0.760    15.700     1.900     1.787     3.450     0.487     0.500
72/12/19 16 00
73/01/26 08 00
CP(T)-                 0.940    15.700     3.700     2.000     4.300     1.090     0.500
73/01/26 16 00
73/02/27 07 00
CP(T)-                 0.410    23.000     7.700     3.200     5.900     0.525     0.500
73/02/27 17 00
73/03/27 07 00
CP(T)-                 0.680    20.000     1.900     2.100     5.100     0.968     0.500
73/03/27 17 00
73/04/26 07 00
CP(T)-                 0.337    25.200     6.400     3.300     7.900     0.539     0.500
73/04/26 16 30
73/05/24 07 00
CP(T)-                 1.200    14.700     0.300     2.000     4.700     1.160     0.500
73/05/24 17 00
73/06/25 07 00
CP(T)-                 0.240    29.000     3.700     2.500     5.500     0.414     0.500
73/06/25 17 00
73/07/18 07 00
CP(T)-                 0.140    26.000     4.900     3.300     5.600     0.475     0.500
73/07/18 16 00
73/08/24 06 30
CP(T)-                 0.089    22.000     7.100     3.320     5.500     0.305     0.400
73/08/24 16 30
73/09/22 07 00
CP(T)-                 0.100    29.000    18.000     1.200     7.200     0.439     0.500
73/09/22 17 00
73/10/24 06 30
CP(T)-                 0.070    42.000    18.000     5.500     9.500     0.400     0.500
73/10/24 16 30
73/11/06 07 00
CP(T)-                 0.130    33.000    15.000     4.200     7.500     0.409     0.500
73/11/06 16 30
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STORET RETRIEVAL DATE 74/12/27                                    500155          AS500155      P001715
                                                                  43 37 00.0 073 10 30.0
                                                                  CASTLETON
                                                                  50       7.5 POULTNEY
                                                                  T/LAKE CHAMPLAIN
                                                                  CASTLETON RIVER
                                                                  11EPALES                  2141204
                                                                  4                       0000 FEET  DEPTH

                                  00630      00625      00610      00671      00665      50051      50053
  DATE     TIME DEPTH NO2&NO3    TOT KJEL    NH3-N    PHOS-DIS   PHOS-TOT     FLOW     CONDUIT
  FROM      OF        N-TOTAL       N        TOTAL      ORTHO                 RATE     FLOW-MGD
   TO      DAY  FEET   MG/L       MG/L       MG/L      MG/L P     MG/L P    INST MGD   MONTHLY

72/12/13 11 00                                                                0.162      0.160
CP(T)-               1.280      3.700      2.000      4.410      5.000
72/12/13 15 00
73/01/29 08 00       9.800      2.100      0.179      5.488      5.535      0.130      0.135
CP(T)-
73/01/29 15 00
73/02/28 08 00                                                                0.136      0.130
CP(T)-               1.900      4.500      1.155      7.400      7.600
73/02/28 15 00
73/03/29 08 00                                                                0.128      0.135
CP(T)-               0.575                 1.790      5.000      5.000
73/03/29 15 00
73/04/23 08 00                                                                0.099      0.126
CP(T)-               6.800      2.200      0.125      4.600      4.900
73/04/23 15 00
73/05/29 08 00                                                                0.082      0.096
CP(T)-              15.200      0.600      0.375      5.400      5.800
73/05/29 15 00
73/06/30 08 00                                                                0.084      0.078
CP(T)-              10.600      0.100K     0.064
73/06/30 15 00
73/07/26 08 00                                                                0.075      0.083
CP(T)-               0.460      4.600      1.760      4.550      6.975
73/07/26 15 06
73/08/27 08 00                                                     7.300      0.083      0.074
CP(T)-                         12.600
73/08/27 15 00
73/09/26 08 00                                                                0.103      0.100
CP(T)-               0.180     33.700     24.000      1.260      2.300
73/09/26 15 00
73/10/22 08 00                                                                0.102      0.097
CP(T)-               0.252      4.600      0.115      3.500      3.800
73/10/22 15 00
73/11/29 08 00                                                                0.098      0.095
CP(T)-               0.090     23.000     12.000      5.700      6.900
73/11/29 15 00

           K  VALUE KNOWN TO BE LESS
              THAN INDICATED
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